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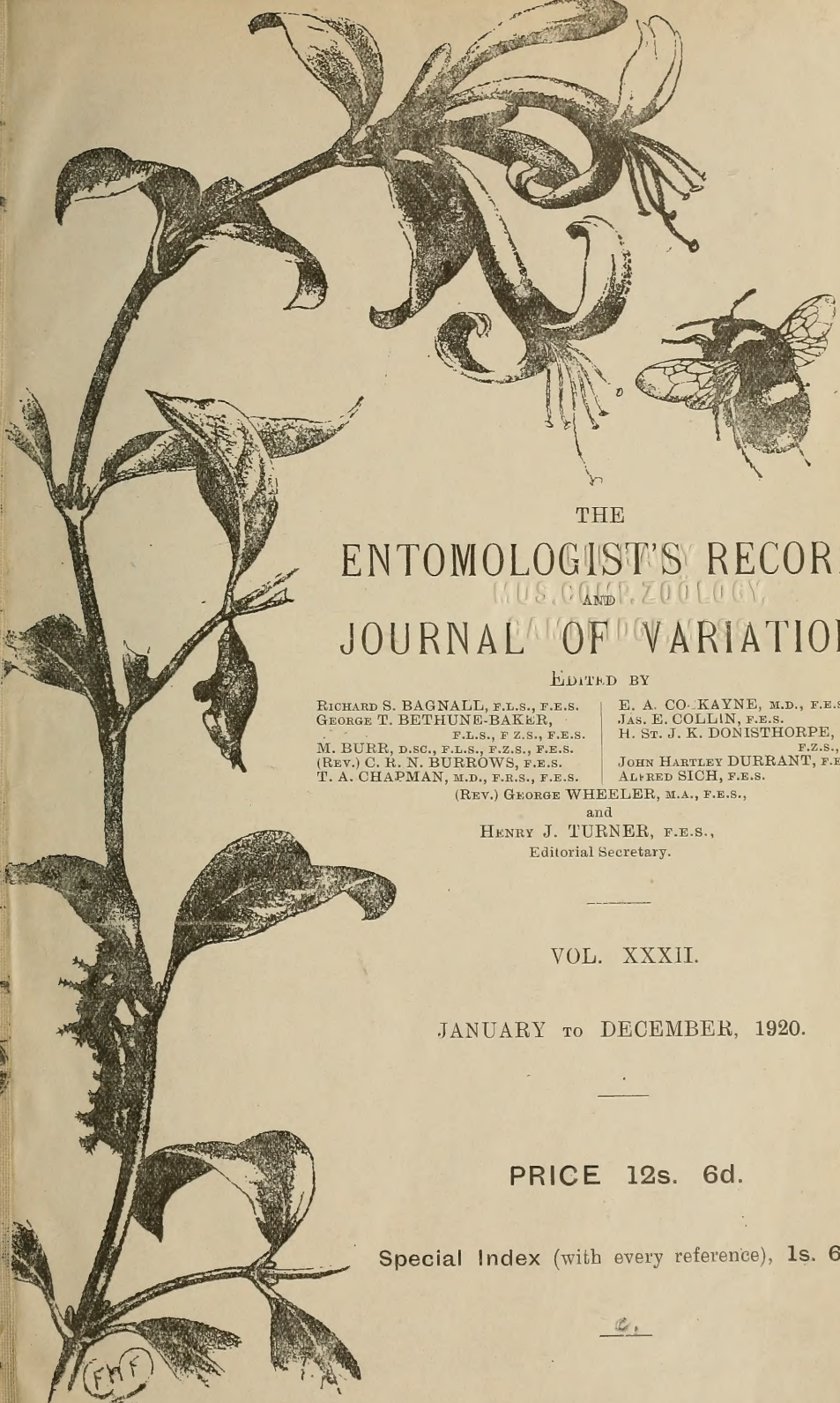
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THE
ENTOMOLOGIST'S RECORD
AND
JOURNAL OF VARIATION

EDITED BY

RICHARD S. BAGNALL, F.L.S., F.E.S.
GEORGE T. BETHUNE-BAKER,
F.L.S., F.Z.S., F.E.S.
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(REV.) GEORGE WHEELER, M.A., F.E.S.,

and

HENRY J. TURNER, F.E.S.,
Editorial Secretary.

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C.

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The Entomologist's Record

AND

JOURNAL OF VARIATION.

VOL. XXXII. No. 1.

JANUARY 15TH, 1920.

The Myrmecophilous Lady-Bird, *Coccinella distincta*, Fald., its Life-history and Association with Ants.

(With two plates.)

By HORACE DONISTHORPE, F.Z.S., F.E.S., etc.

(Concluded from Vol. xxxi., p. 222.)

The most difficult problem in connection with *C. distincta* is to explain why it is always associated with ants. The beetles, as we have seen, do not as a rule hibernate in the nests; nor do the larvæ and pupæ live in the nests, nor are the eggs dropped on to them, as is the case with *Clythra quadripunctata*. The lady-birds (and their larvæ) will feed on any plant-lice and could often obtain a richer supply of food by visiting trees far away from the *rufa* nests, as do the ants themselves. Therefore it is not a question of food. It cannot be to obtain protection from the ants because its nearly the seven-spot lady-bird is much more common and occurs everywhere miles away from *F. rufa* nests. The fact that the latter sometimes occurs with *distincta* on the trees over *rufa* nests, and also alone in such situations—at Oxshott I frequently find *sempunctata* on fir trees over *rufa* nests, but have never been able to discover *distincta* there—serves to show the kind of variation in habit which may lead to a myrmecophilous mode of life, and not why it lives such a life. Wasmann³⁵ considers that *distincta* has adapted itself to such a life through a spontaneous variation, which embraced and retained, gave to the species a new direction in evolution, and this in spite of the limitation in food-supply which was incidentally brought about through this new habit. He believes that it has differentiated itself—not through, but in spite of the operation of natural selection—into a true morphological species. This again does not explain why it lives with ants, but only how the habit started; moreover I am more inclined to think that the habit was brought about gradually, by its ancestors experimenting in a myrmecophilous existence, as we see *sempunctata* doing at this day. [For other examples of a like nature—see my paper “On the Origin and Ancestral Form of Myrmecophilous Coleoptera.” *Trans. Ent. Soc. Lond.* 1909 413-29]. I consider the reason for its association with *F. rufa* is that it is a Müllerian mimic of *Clythra 4-punctata*. In 1900²⁴ I wrote of the latter—“I am inclined to think that this beetle is a mimic of *Coccinella distincta*, as it has a strong superficial

JANUARY, 1920.

resemblance to a 'lady-bird,' and the *Coccinellidae* are known to be distasteful to insectivora." Again in 1901²⁵ I repeated this statement, but added—"At the same time *Clythra* may be distasteful on its own account, and thus provide an example of Müllerian mimicry, a question which I hope to settle this year." As mentioned in my paper on "The Life History of *Clythra quadri-punctata*, L." (*Trans. Ent. Soc. Lond.* 1902 11-23) I proved the *Clythra* to be distasteful by experiments with various birds, lizards, marmosettes, etc., at the Zoological Gardens. We therefore see that it is a case of Müllerian mimicry, and I now think that the *Coccinella* is a mimic of the *Clythra*, and not *vice versa* as I originally suggested. The *Clythra*'s eggs, larvæ, and pupæ occur in the ants' nests, and it is a commoner and more widely distributed species—it ranges from Sutherland in Scotland to Cornwall and the Isle of Wight. This suggests that the *Coccinella* is of comparatively more recent phylogenetic development; and it is also highly specialized as regards the male genitalia.

It has been suggested that as the shape of *C. distincta* is very different from that of *Clythra*, it can not be a mimic of the latter; but mimicry can be valuable in spite of differences in shape, furthermore that shape may be very stable and difficult to alter, as probably here, for it runs through many allied species. Everyone will agree that *C. distincta* is more like *Clythra* than is the common *C. 7-punctata*, as the shape is actually a little longer, and the spots much larger than in the latter. I have also been told that as the size of the spots varies in other species of *Coccinellidae*—for example my subspecies *boreolitoralis* of the common eleven-spot Lady-bird, *C. undecimpunctata*, L., which occurs on the coasts in the north and west—these also ought to be mimics of *Clythra*. Variation occurs independently in different species and may produce the same results for different reasons, and one might just as well maintain that *C. distincta* ought to occur on sandy coasts! *Coccinella distincta* and *Clythra quadripunctata* are frequently found together on the trees over, and flying round the nests, and it must be admitted that by those who are not Entomologists, Coleopterists, or specialists, they might well be mistaken for each other.

My friend Professor W. M. Wheeler writes in one of his charming papers ["The Parasitic Aculeata, a Study in Evolution" *Proc. Amer. Phil. Soc.* 58 1-40 (1919)]—"There is undoubtedly much to be said in favour of the opinion commonly held by entomologists that the fruitfulness of their investigations is apt to be directly proportional to the intensity of their specialization, but it is also true that this very specialization may often preclude an adequate appreciation or even a recognition of phenomena that would profoundly impress the worker who possesses more general biological interests." This statement is not inapplicable to the subject in question.

Both species are distasteful, both exhibit warning colours, and it would be an advantage to the *Coccinella* to have shared any experimental tasting by young birds, etc., with the *Clythra*, which would help to protect it in the winter when birds are hungry and will sometimes eat insects they would not otherwise touch.

The *Clythra* dies off in the summer, whereas, as we have seen, the *Coccinella* passes the whole winter on the trees over the *rufa* nests.

If it be admitted that it is an advantage to the latter to resemble the former, then natural selection would have seized on any small

variations that arose, the larger size of the spots, etc., and gradually increased the same. I have submitted this part of my paper to my friend Professor Poulton and he considers that the above arguments are quite sound, but would not exclude the possibility of some additional advantage being gained by the selection of trees in the neighbourhood of the ants' nests, and therefore presumably visited more freely than others by the ants.

The life history of this insect may be briefly recapitulated as follows:—

Coccinella distincta passes its whole life in the immediate neighbourhood of ants' nests. Copulation takes place in May and June, and the female lays her eggs on the underside of pine needles, and leaves of trees, over the ants' nests. The eggs are long, bright yellow in colour, and arranged close together two and three abreast, varying in number from seven to some twenty odd. The eggs hatch in five to seven days, and the young larvæ feed on the Aphids on the trees on which they were born. There appear to be four moults, and the full-grown larva fastens itself up ready to pupate, having spent some twenty-five to twenty-nine days in the larval condition. It pupates in three to five days and about nine to eleven days elapse before the imago emerges from the pupal skin. The whole process lasting some forty to fifty days. The perfect insects feed on the plant lice on trees close to the nests, and the majority of them pass the winter on these trees; a few individuals only entering the nests for hibernation. Usually there is only one generation, but in some years, when the weather is favourable, there may be two.

Finally I consider the reason for its occurrence with *Formica rufa* is that it is a Müllerian mimic of *Clythra 4-punctata*.

EXPLANATION OF PLATE I.

1. Eggs of *Coccinella distincta* on pine-needle.
2. Pupa of *Coccinella distincta*.
3. Empty pupa case of *Coccinella distincta* on pine-needle.
4. top. *Coccinella distincta*, Fald., subsp. *labilis*, Muls.
4. middle. Form with spots 1 on elytra very small, showing a disposition to become effaced and approaching the type form *L. distincta*.
4. bottom. *Coccinella distincta*, Fald., subsp. *labilis*, Muls., ab. *domiduca*, Weise.

EXPLANATION OF PLATE II.

1. Small larva of *Coccinella distincta*.
2. Full sized larva of *Coccinella distincta*.
- 5 & 3. Male genitalia of *C. distincta* (5. median lobe, etc.; 3. tegmen, etc.).
- 6 & 4. Male genitalia of *C. septempunctata* (6. median lobe, etc.; 4. tegmen, etc.).

Seasonal Polymorphism and Races of some European Grypocera and Rhopalocera.—Additional Notes.

By ROGER VERITY, M.D.

(Continued from page 201.)

Hesperia serratulae, Rbr., and *H. carthami*, Hüb. The races of the Sibillini Mountains in Central Italy do not seem to differ from the Alpine ones, judging by a comparison with those of the Baths of Valdieri, although the former locality is separated by such a distance from the Alps, and both the species are not known to occur in any other intermediate one.

Hesperia alveus, Hüb., race CENTRALITALIAE, mihi. What has been said of *serratulae* concerning the distribution may be repeated here, but in this case individual variation is distinctly different and clearly constitutes a different race. The size varies much less than in the Alps and the Pyrenees, keeping constantly to the lesser size known (23mm.-25mm. in expanse); the wings are narrow and elongated; the extent of the white spaces varies on the contrary very much more than usual, specimens with a well defined band-like space of a distinctly white tone on hindwing being quite frequent in both sexes, and much more so than the opposite extreme variation, in which those wings are uniformly grey; the underside of hindwings varies widely, ranging from the form with dull greyish-green, and with extensive white spaces having their outline rather shadowed, to the form with bright yellowish-green and with white spaces limited in extent and sharply outlined. The latter, when combined with the very white spaces on upperside of hindwing, mentioned above, so resemble *foulquieri* that Querci and I have not been able to detect a way of separating them from it, and we only know they are *alveus* from the verdict of Reverdin, who has examined their genitalia microscopically. Notwithstanding these exceptional specimens, which might well be called FOULQUIERIFORMIS, mihi, *alveus* and *foulquieri* keep, on the whole, distinct in the Sibillini mountains, as in other regions, and can be separated with a little care and practice, so that we do not doubt they are distinct species, as supposed originally by Oberthür, and confirmed very emphatically by Reverdin on examining the genitalia.

Hesperia foulquieri, Obth., race PICENA, mihi. M. G. Foulquier has kindly collected for me a nice series of the nymtypical race from St. Zacharie in the Var; on comparing it with the Sibillini Mountains one, I find they differ considerably: the Italian insect is much frailer, and its narrow wings give it a much smaller appearance than would seem from actual measurements of the expanse (about 24mm. as compared to the 26mm. of the French one); the colour is a little duller and inclining more to brownish, more suffused with grey scaling on the forewing, and with more extensive white spaces on hindwing, which culminate in the very white *bellieri*, Obth. This was suspected to be a distinct species, but the *genitalia* gave no evidence in this sense, having been found identical with those of *foulquieri*; although in the locality of the "types" (Larche) it greatly predominates, it evidently is but a distinct mountain race; the material collected in the Sibillini by Querci distinctly points to this conclusion. In 1919 the captures were as follows: ♂s *foulquieri*, 15; transitions to *bellieri*, 8; *bellieri*, 4; ♀s respectively 17, 4, and 4. I have called "transitions" those specimens which on the upperside came very near the extent of white of *bellieri* or reached it entirely, whereas on the underside they had the limited white spaces, broken up into separate spots, of *foulquieri*, and not the broad band-like spaces of *bellieri*; this form might be called SUPRA-BELLIERI, mihi.

Heteropterus morpheus, Pall. This species was discovered in Italy by Calberla at Monte Rotondo, 165m., near Rome, and no other locality had been discovered since, to my knowledge, in peninsular Italy. It has now been found in June, 1919, in the Mainarde Moun-

tains (prov. of Caserta), at 500m. altitude, near Villalattina. These isolated colonies, in the south, of species proper to Central Europe, and separated by hundreds of miles from their congeners, are interesting to notice.

The other species found in Central Italy under the same conditions, are the following :—*Gegenes nostrodamus* (collected by Rostagno round Rome, and pronounced by Reverdin to be this species, distinct from the widespread *lefebvrei*); *Hesperia alveus*, *H. foulquieri*, *H. serratulae*, *H. carthami** (all four found as yet in the Sibillini mountains only); *Erynnis boeticus* (Sibillini and Oricola, on boundary between Latium and Abruzzi; only two or three specimens known)*; *Hirsutina dolus* (Sibillini and Abruzzi); *Polyommatus tithonus* (= *eros*) (Sibillini and Abruzzi); *Aricia eumedon* (Aurunci mountains and Aspromonte in Calabria); *Iolana jolas* (Bologna, Rome, and Aurunci mountains); *Lycaena arcas* discovered by Querci at the end of June, on Mt. Cairo, above Montecassino, at the junction of the paths from Colle S. Magno and Castrocielo); *Lycaena alcon* (discovered by Turati at Sestola on the Modenese slopes of Mt. Cimone, in July, and said to have been found in the Abruzzi by Standfuss); *Klugia spini* (Sibillini, Aurunci, and Mainarde mountains); *Anthocharis euphenoides* (at Filettino, in the Simbruini mountains, in S. Latium); *Coenonympha dorus* (Assisi, discovered by Wheeler, and Sibillini); *Erebia gorge* (Sibillini and Abruzzi); *Melitaea aurinia* (Aurunci mountains); *M. trivia* (said to have been found by Stauder in Calabria); *M. parthenie* (Sibillini and Abruzzi); *Brenthis pales* (Abruzzi).

Rumicia phlaeas, L., race NIGRIORELEUS, mihi, race VARI-ELEUS, mihi, and its other European races. Tutt, in *Brit. Butts.*, i., has made a remarkably accurate and exhaustive critical analysis of the bibliography of this species. From it, and from a few further observations on *phlaeas* in the South, I think the following synthetical conclusions can be drawn concerning seasonal polymorphism and races in Europe. These are invariably produced by variation in the shape of the wings, and especially by different degrees of melanism (in the summer and autumn broods), which constitute a progressive series along one single line. The following grades are clearly discernible and broadly correspond to geographical areas in their distribution, as will be seen when dealing with the races they produce: (1) form *phlaeas*, L.; (2) form *initia* [= *caudata*], Tutt: no black suffusion over copper ground-colour of forewing, but broader dark bands along the three margins; I should add that the external margin of forewings is straighter, that the black dots are larger, and that the band-like copper space of hindwings is reduced in extent, just as it is in all the following forms; (3) form *eleus*, Fabr.: a

* *H. alveus* is a species about which one may be easily mistaken, but *H. serratulae* certainly occurs at Palona in the Abruzzi, and at Subiaco. *H. carthami* occurs at Roccaraso and Villala in the Abruzzi on Monte Subasco, Assisi, where I have taken several specimens at the side of the path leading to the "Carceri." *H. dolus* and *L. idas* also occur at Assisi; the former on both sides of the road leading to Piano della Pieve, and of the latter I have taken one worn ♀ only (being too late for the species) just above the Cemetery road. *K. spini* also occurs in the Abruzzi, near Aquila, at Sulmona, and at the Lago di Scanno, as well as at Subiaco. (See *Ent. Rec.*, xxi., pp. 250, 252, 253; xxii., pp. 258, 276, 286.)—[G.W.]

black suffusion, always abundantly mixed with copper, covers the hind part of forewing more or less up to cubital nervure, and to its anterior branch; Tutt has called *suffusa* the corresponding form with no tails to hindwings; (4) form *aestivus*, Z.: like the preceding, but with a much denser and slightly more extensive suffusion; (5) form *fuscata* [—*caudata*], Tutt, the whole of the copper replaced by dark scaling, except, in less extreme specimens, two small areas "before and beyond the discal spot" showing very faintly. Melanism and all these characters are far less marked in the female. The seasonal and geographical distribution of these forms in Europe can be tabulated as follows:—

RACE.	FIRST GEN.	SECOND GEN.	THIRD GEN.	FOURTH EXTRAORD. GEN.
Lapland, <i>hypophlaeas</i> , Boisd.		(one generation only)		
Extreme N. Europe, <i>phlaeas</i> , L.	<i>phlaeas</i> .	<i>phlaeas</i> .	(none)	
N. Europe, <i>initia</i> , Tutt.	<i>phlaeas</i> .	<i>initia</i> .	<i>phlaeas</i> .	
Southern N. Europe, <i>suffusa</i> , Tutt.	<i>phlaeas</i> .	<i>suffusa</i> .	<i>initia</i> .	
Central Europe, <i>initia-caudata</i> , Tutt. and <i>eleus</i> , Fabr.	<i>phlaeas</i> .	<i>initia</i> - <i>caudata</i> .	<i>initia</i> .	
Northern S. Europe, <i>nigrioreleus</i> , Vrtz.	<i>phlaeas</i> .	<i>nigrioreleus</i> .	<i>eleus</i> .	<i>initia</i> [— <i>caudata</i>].
Southern S. Europe, <i>aestivus</i> , Z.	<i>phlaeas</i> .	<i>aestivus</i> .	<i>eleus</i> .	<i>initia</i> - <i>caudata</i> ? [— <i>caudata</i>].
<i>fuscata-caudata</i> , Tutt.	<i>phlaeas</i> .	<i>fuscata</i> - <i>caudata</i> .	<i>eleus</i> .	<i>initia</i> - <i>caudata</i> ?

It will be noticed that the highest degree of melanism is always produced by the second gen., which consequently characterises the race.

The race *hypophlaeas*, B., of Lapland, is very distinct and stands apart from the single line of variation of the others; it is like the American one. The nymotypical race is said by Linnaeus to "*habitat in pratis Westmanniae*." The race *initia* initiates seasonal dimorphism in the second gen., and perhaps in the third, which differ from the first in most individuals. The race *suffusa* of the South of England resembles *eleus*, but only has marked tails quite exceptionally. In the two Central European races the forms *initia-caudata* and *eleus* are found mixed together in the second gen., one or the other predominating, and a few *aestivus* appearing now and then amongst them. I have found it necessary to create the new name of *nigrioreleus* for the next grade, as it could in no way be joined on either to *eleus* or to *aestivus*; the form *initia-caudata* is frequent in the second generation amongst the precocious sporadic emergences of May and in early June, but later it nearly entirely disappears, and some individuals are *eleus*, whereas more than half the individuals belong to transitions from the latter to *aestivus*, which is frequent even in its most highly characterised form, although percentages fluctuate according to localities; the third generation contrasts sharply with the second only in the tardy families (in Florence, after September 15th, early ones emerging from the end of August), because in these it retrocedes of two grades to *initia-caudata*, whereas

early families belong chiefly to *eleus* with still quite a good percentage of *aestivus*; the fourth extraordinary generation comes still nearer *phlaeas*, the tails becoming very short and often as in the northern *initia*, which it resembles furthermore by its small size; there thus exists in Tuscany the entire scale of variation, completed by the existence of *fuscata-caudata* as an extreme variation in the race *aestivus* of the Isle of Elba: in my series of 34 males from this locality, five are perfect specimens of it; the rest vary much less than on the continent, and, more or less, all belong to the form *aestivus* except early specimens of May. Zeller first described the very dark summer brood of southern Europe from series of "the mountains above Messina," and Tutt rightly points out (page 371) that this name, although unfortunate for a race, must be used for the southern one. I now add the suggestion that it should be restricted to races similar to the Sicilian one, in which *aestivus* largely predominates and *fuscata-caudata* makes its first appearance as an extreme individual form, whereas race *nigrioreleus* never produces it. Finally, when *fuscata-caudata* is abundant or predominates the race should take this name: it is more likely to occur in the eastern Mediterranean, as suggested by Tutt, but two out of three specimens collected by me during a short excursion in a little marsh near Tempio, in Sardinia, belong to this form; I was deterred from enquiring further into the matter by the presence of several bulls nervously inspecting me and my net.

I need scarcely say that the geographical areas mentioned above are set down on broad lines, for, locally, one may find in each, races which come near the races of other regions. In the hottest Alpine valleys the form *aestivus* is frequent, but it occurs mixed with the extreme opposite variations; thus, the medium is brought back to the *eleus* grade in these very variable races, such as are those of many species in the Alps: *varieleus*. On the contrary, at the highest altitudes of *phlaeas* in the Apennines, melanism is as limited as in Central Europe, and the same names *eleus*, and even *initia-caudata*, are well suited to it. As a general rule, at equal temperatures, dampness increases melanism, so that it often increases markedly in the Alps and constantly in the Islands and in marshy localities.

The table given above shows that in this species seasonal and geographical variations are identical. In the production of race-characters in the Lepidoptera, phenomena of two orders generally combine: heredity and surroundings. It is clear that in this species the latter alone produce them by their action during the development of each individual; even here, however, a slight hereditary difference seems to have been produced, because Weismann [*Ent.*, xxix., p. 75] claims to have proved by experimental breeding that extreme northern races respond more to cold, and southern races to heat. The races *hypophlaeas* and *chinensis* show, besides, some characters which seem hereditary; they might be called "PHYLOGENETIC" races, as compared to the "ONTOGENETIC" European ones described above, which altogether consist of only one phylogenetic race, equivalent to *hypophlaeas* or to *chinensis*. A high degree of ontogenetic variability is perhaps a prelude to phylogenetic scission or differentiation; it evidently is an index of sensitiveness to surroundings, and one would naturally take it to mean a state of instability. Most Lepidoptera produce individuals or entire generations which resemble other kindred races, but a periodical

return to a constant type, such as takes place in *phlaeas* in its first generation, is very unusual. It seems obvious that in a case of this sort the thought of instability must be discarded, and the hypothesis of an unusually high degree of "individual elasticity" is more likely to be correct; this would allow the species, or one of its races, to move into very different surroundings without being compelled to modify itself for adaptation, by recurring to its "specific elasticity" (see introduction to *Rhopalocera Palaearctica*).

That individual elasticity, if drawn too far, must issue in a phylogenetic split (to use the mechanical image of the process further), and in the establishment of two new centres of balance, seems to be shown by the fact that allied genera carry on variation along the same line either in one direction or in the other. In this case of the *Chrysophanidi* sexual dimorphism brings it to its extreme limits both ways in the male: in *Thersamonia*, *Chrysophanus*, and *Heodes*, the reduction in the extent of the dark scaling of nymotypical *phlaeas* is pushed to its total or nearly total obliteration; in the *Loweia* the dark suffusion of *fuscata* goes so far as to cover the whole of the wings. It will be noticed that the *Lycaenidi* vary in broad lines in an exactly parallel way; the *Lycaena* correspond roughly to *Rumicia*, and still better to *Kasyapa*, Moore; the *Raywardia* to the *Thersamonia*, the *Aricia* and the females of *Polyommatus*, *Agriades*, *Plebeius*, etc. to the male type of pattern of *Loweia dorilis*, whilst the males of the three genera last mentioned take up and develop to its highest degree the male refracting scaling which is golden in *virgaureae*, *dispar*, etc., and which becomes violet in *hippotoë*, *alciphron* and *amphidamas*, etc., besides the uniformly black ground colour, which is seen in *eumedon*, and which acts as a background in *thetis*, *icarus*, etc., and gives the reflected light its brilliancy, thus also greatly due to extreme melanism. In the genus *Lycaena* and others the blue, on the contrary, is equivalent to the copper of *Rumicia* and of the females of other *Chrysophanidi*, and originates from the so-called ground colour of the wing, so that it increases as the dark pattern diminishes in extent, in a way exactly inverse to that of the blue mentioned before. All this constitutes only one of the countless examples offered by the Lepidoptera, which tend to show that variation occurs according to definite plans; these are seen on a lesser scale in the individual variations of races and species, and reappear in a magnified form when allied species or genera are compared to each other, besides repeating themselves more or less completely and constantly in each equivalent and collateral branch.

(To be continued.)

The Sydney Webb Collection of British *Rhopalocera*.

This famous collection, rich in aberrations, was sold at Steven's Auction Rooms on the 21st October and 9th December last. Admittedly the collection was one of the best in private hands in the country, and a short description of the principal lots and prices obtained, should be of interest. The first sale commenced with the *Pieridi* and ended with the *Argynniidae* as far as *Brenthis selene*, a fine lot of 15 *Chrysophanus dispar* coming as a finale.

Lots comprising 1 to 8 *Papilio machaon*, nearly all being minor

aberrations, fetched from 5s. to 18s., and one lot, including a specimen of deep ground colour, realised 30s. The *Aporia crataegi* caused more competition, and a male with a broad dark colour from the Bond Collection realised £3 15s. Another dark bordered male with 7 others realised £1 5s. Considering the rarity of aberrations in this species, the purchaser of these two lots undoubtedly obtained a bargain. A female var. of *Pieris brassicae* with very large united spots realised £2 10s. Minor aberrations and forms of *Pieris rapae* and *P. napae* in lots of over 20 were sold for prices varying from 5s. to £2 5s. The *Pontia daplidice* prices varied from 16s. for three to 45s. for lots of one and two. With the arrival of *Euchloë cardamines* prices began to soar, a pale orange form and a specimen with all the black scales on the upperside and underside absent went for £5. Specimens with pale orange tips realised 25s. and 60s. each, and a perfect gynandromorph was bought for £5. Other gynandromorphic specimens realised 90s., 80s., 65s., 65s., 110s., and 50s. each, and a specimen with white spots in orange, with disc of wings and underside pale pink 120s. A perfect gynandromorph of *Gonepteryx rhamni* was acquired for £9, and other gynandromorphic specimens realised £7 10s., £7 10s., 25s., £2 2s., £2 15s., and £1 8s. A specimen of *Colias edusa* with suffused disc of forewings and black markings, figured by Newman, was bought for £2 5s., and one rayed and suffused with black for £5. A perfect gynandromorph went for £9. Lot 88—Three wings *helice* and the fourth hindwing *edusa*, was accused of being a manipulated specimen and had to be coupled with the next lot. Various forms of this species and *Colias hyale*, in lots of 1 to 16, realised from 5s. to £2 5s. The outstanding specimen among the *Melanargia galathea* was a fine light var. from the Harper Collection figured by Barratt, p. 28, fig. 1, c., sold for £8 10s., and one with buff ground for £3 15s. Lot 103 was challenged as being a type of a Continental species resembling *galathea*.

A really beautiful specimen of *Pararge aegeria*, nearly unicolorous, brought £5, and a *Pararge megera*, with unicolorous pale hindwings, the ocelli on a fulvous band, was acquired for £5. Another entirely brown with clear fulvous disc to forewings was sold for £3 10s., and a nearly unicolorous light female for £4 4s. A white female was cheap at 16s., and a curiously marked female, figured in Barrett, p. 32, fig. 1d., from the Cox collection, went at the bargain price of 16s. Lot 112 was challenged as being a Continental insect closely allied to *P. megera*, and was not competed for. Bleached and pale specimens of *Epinephele jurtina* and *E. tithonus*, in lots of 1 to 22, realised from 15s. to 30s. each. A white male of *Hipparchia semele* and a female without spots was bought for £3 5s., and a gynandromorphous specimen, taken at Ipswich in 1868, in excellent condition, was acquired at the absurd price of 10s. A specimen of *Aphantopus hyperantus* ab. *lanceolata*, realise £2, and pairs of white *Caenonympha pamphilus*, 14s. to 18s. *Apatura iris*, with white bands and spots more or less absent, fetched £3 10s., £6 10s., £5 10s., £10 10s., and £16 16s. each, and one with white bands absent on forewings, in good condition, for the curiously low price of 12s. A specimen with buff marking and pale band near margin of hindwings, £3 10s.

Limenitis sibilla with white bands more or less obliterated, realised from 8s. to £2 10s. each, and one entirely black, figured in Newman, p. 67, £6 6s. Eighteen *Euvanessa antiopa* fetched from 10s. to 60s.

each, according to condition. Two aberrations of *Pyrameis cardui*, similar to one figured in Newman, p. 64, brought £7 each. A very long series of *Pyrameis atalanta* produced nothing higher than 16s., there being no striking aberrations. The series of *Vanessa io*, including forms of ab. *belisaria*, produced £6 10s., £11, £11, £6, £3 10s., £1 4s., £4 10s., £4, £2, £2 5s., and £12 12s., this last being an exceedingly beautiful specimen with green ocelli. A very curiously shaded example was sold at an absurdly low price of 10s. Some very varied *Aglais urticae* realised £6, £2 5s., £3, £2, £2, £7, £2 15s., and £11. The gem of the series was a light specimen with the black markings mostly absent, and was run up to £18. Three good aberrations of *Polygonia c-album* realised £2, £3 10s., and £1 7s. 6d. each.

The Fritillaries now came to the table, and included really beautiful forms. *Dryas paphia* with cells black and a broad band through the wings and rayed margins brought £7 10s. Two extremely pretty aberrations, one figured in Newman, p. 22, and one similar, were surely not dear at £2 15s. and £2 10s. each. A female with dark forewings and one with a cluster of large spots on the forewings together produced £7 7s. A dark female with suffused spots reached 60s., and one with bluish spots or blotches on all the wings and described as half *valesina* and half *paphia* brought £4 10s. The *valesina*-like male figured in "Mosley's Varieties," a rather worn specimen, was acquired for £9. The series of *valesina* did not shew anything out of the usual, which was surprising considering the number of *paphia* varieties. Some fine *Argynnis cydippe* (*adippe*) now appeared, and a very suffused specimen figured in Barrett, p. 23, fig. 1c., cost the buyer £14. Another with half of forewings suffused fetched £11. Lot 284 with forewings almost entirely black, produced a sensational first bid of £20, and was secured by the next bid of £22 for a Museum. It seemed rather a dear purchase. This price, I believe, created a record for a specimen of a British butterfly. Another *cydippe*, greatly obscured and with silvery spots at base of hindwings, and figured in Barrett, p. 23, fig. 1b, went for £17. Suffused *Argynnis aglaia* realised £2 5s., £4, and £8 each, and a var. *charlotta* figured in Newman, p. 26, realised £8. Eight *Issoria lathonia* realised 20s. to 40s. in lots of one or two, and a variety with three spots in inner margin fetched £2 10s. Five cream and yellow or buff *Brenthis euphrosyne* realised from £2 2s. to £3 3s. each, and one light variety with band of large spots near the margin £5 10s. A very lovely *B. euphrosyne* figured as *Brenthis selene* in "Mosley's Varieties," plate 5, fig. 4, with light forewings and broad band on hindwing margins, and one very similar brought £11 11s. each. Another almost entirely suffused fetched £11, and other heavily marked examples realised £2 2s., £8, £3 10s., £2 15s., and £3 each. A golden yellow *Brenthis selene* figured in "Mosley," plate 5, fig. 2, reached £2 10s., and a rayed underside figured in Newman, p. 37, £8. Another with tawny forewings realised £3, and one almost entirely black upper and underside cost the purchaser £21, the second highest price in the sale. Fifteen *Chrysophanus dispar* completed the sale, and these, which were all very fine and in exceptionally good condition, went for prices varying from £5 10s. to £7 for the males, and £4 10s. to £12 10s. for the females. A pupa case realised £5.

The total amount realised by the first day's sale was about £920, constituting I should opine, a record, and there were 352 lots.

contained in 16 cabinet drawers. Most of the specimens were in good condition although somewhat faded as might be expected as the collection was an old one, numbers of the insects being from the Bond and other contemporary collections. It was noticeable that all the insects described as being figured in well known Entomological works realised good prices. The majority of the extreme aberrations were acquired for the Percy Bright Collection, and Mr. Horne, of Aberdeen, also made many purchases. Messrs Newman and Janson were also buying, presumably on commission.

(To be concluded.)

Remarks on Hubner's Tentamen.

By J. McDUNNOUGH, Ph.D., Ottawa, Canada.

In the May number of the *Ent. Record* for 1919, the second instalment of Baker and Durrant's comparison of Jacob Hubner's Tentamen with his Verzeichniss, elucidating his system of Lepidoptera, is prefaced by a few remarks by my good friend Mr. Bethune-Baker, who strongly supports the view that the Tentamen creates generic names perfectly valid for use by systematic workers.

As my name is mentioned as one of those opposing the adoption of the "Tentamen" terms as valid genera, perhaps a few brief words, explaining my views more explicitly than I have heretofore done, may not be amiss.

The question of the validity or non-validity of the so-called "genera" of the Tentamen has already been the subject of much controversy, and no one is more anxious than I am to arrive at a definite decision regarding this perplexing pamphlet. Until this is done it will be impossible to introduce stability into the generic nomenclature of Lepidoptera as, owing to the early date of issue (1805), the Tentamen terms, if accepted, will take priority over numerous long-established generic names.

Since the publication of the brief statement in the introduction to Barnes and McDunnough's Check List of North American Lepidoptera, I have given the matter considerable further study, and I am now perfectly willing to agree with Mr. Baker that we must consider the Tentamen to have at least been published, and that it certainly will not be sufficient to discard the terms therein proposed as *ined.* This, however, does not settle the matter to my mind, and we are still faced with the question as to whether Hubner created what can be termed modern genera in the aforesaid work or not.

It is a well-known fact that Hubner did not employ the term "genus" to signify the category immediately above a species. The Hubnerian "*coitus*" as used in the Verzeichniss has been, however, generally accepted as typifying the modern "genus" and as fulfilling the requirements of the International Code in respect to generic validity. Turning to the Tentamen, we at once see from the title that Hubner is not dealing with *coiti* but with *stirpes*, and that, in fact, the Tentamen is but the merest skeleton of a system which was amplified ten years later in the Verzeichniss, where the *stirpes* of the Tentamen are employed *only in a plural sense* and correspond with our modern ideas of a subfamily, or even family. The unfortunate fact remains that, in the Tentamen, Hubner, besides his plural usage, actually has

employed the stirps name in the singular in connection with a valid specific name. To an unbiased mind it must seem evident that the intention was merely to cite a species considered by the author to be typical of each stirps, and the usage of the term in the singular number was probably merely to conform to the rules of correct Latin; one of the strongest arguments in favour of this view is the fact that in the *Verzeichniss* each and every specific name used in the *Tentamen* is placed by Hubner in a coitus not identical in name with the term employed in the *Tentamen* (as would naturally be the case if he had intended creating coiti in this pamphlet), but for which he either uses a generic name created by one of the early writers (Fabricius, Schrank, Ochsenheimer, etc.), or, failing this, actually proposes a new term.

The vital question then is, briefly stated: Did Hubner by his employment of a stirps name in the singular, along with a valid specific name actually—even if unintentionally—create a valid generic name? Common sense would seem to tell us, No, but on the other hand there is nothing in the International Code which would definitely forbid the use of these terms as genera, nor can I find any ruling under the Opinions rendered by the International Committee which would cover this case. Under the Code the sole absolute requirements for generic validity would appear to be uninominality and association with a valid specific name.

I would, therefore, offer the suggestion that the decision be left to an International Committee. I, for one, would willingly abide by their ruling, and I am sure that most systematic workers in Lepidoptera would be glad to see the end of a vexation question which, while affecting considerably the nomenclature of Lepidoptera, has, after all, no vital bearing on the larger problem of the interrelationships of the various species.

[I am very glad to see my friend Dr. McDunnough's paper and to read his views on the *Tentamen*. Especially important is his view that it is no longer possible to consider the publication referred to as "ined."

I cannot however follow him in his effort to reconcile the exact terminology of the *Tentamen* with the *Verzeichniss*. It is to me immaterial whether "stirpes" and "coiti" have any relation to the *Tentamen* or not, because such relationship would not invalidate the nomenclature of the latter. Priority of publication is the all important point and this being so the nomenclature of the *Verzeichniss* falls to the *Tentamen*.

Dr. McDunnough says of the *Tentamen*: "Did Hübner by his employment of a stirpes name in the singular along with a valid specific name—even if unintentionally—create a valid generic name?" He replies to his question by saying "Common sense would seem to tell us No."

Here I differ entirely from my friend. It is years ago since Tutt's reprint of the *Tentamen* came into my hands, and I then studied the question quite independently and came to the same conclusion that Mr. Durrant had already come to. At that time I had no knowledge that Durrant had worked out the two schemes in tabulated form as they have appeared in the pages of this journal, it being only last year that I discovered this, when I asked him to help me tabulate the two works. He then told me he had got the whole thing worked out. I

mention this now merely to show that I had come to the same conclusion as he had from an independent and unbiassed standpoint. But to reply to Dr. McDunnough. Why does he insert the word "stirpes" in his question, this confuses the issue, "stirpes" and "coiti" have nothing to do with the issue, the *Tentamen* does not refer to them at all. It uses "Phalanx" and "Tribus" and it then splits up the latter into sections, and in my judgment the use of the singular name with the specific name definitely creates what we now call a genus or a generic name. Let me give a few examples.

The *Tentamen* in Phalanx I., Tribus I., says "Nerëides—*Nerëis Polymnia*."

The *Verzeichniss* divides Nerëides up into four families, Familia A. B. C. D. Familia A., "Vitreæ," is divided into six genera, "coiti." Familia B., "Fulvæ," is divided into five genera of which the third is "Mechaniten—*Mechanitæ*" with three species "*Mechanitis eicrate*, *Mech. lysimnia*, *Mech. polymnia*," but *Nereis polymnia* of the *Tentamen* has priority, and *Mechanitis* therefore falls as a synonym to *Nerëis*.

In all cases the author gives the vernacular equivalent of the Latin name, in all cases he gives the plural in the first instance and the singular with the specific names. Let us consider a couple more examples. In Tribus II. the *Tentamen* gives "I. Rustici—*Rusticus argus*"; the *Verzeichniss* drops the use "Rustici" and adopts that of "Adolescentes," which it divides up into eleven genera or "coiti," the fifth of these is "Lycæidæ," the first species of this genus being "No 670 *Lycæides argus*, Linn." It is quite evident that the name *Lycæides* must sink as a synonym to the earlier *Rusticus* whilst "Adolescentes" should also fall to "Rustici" should such a super group name be necessary.

Again in Phalanx II of the *Tentamen*, the first citation is "I Zygaenæ—*Zygaena filipendulæ*." The *Verzeichniss* divides Zygaenæ into Familia A and Familia B. A is subdivided into two genera and B is subdivided into six genera (coiti) of which the fourth is "Thermophilæ," No. 1273 being *Thermophila filipendulæ*. Here again as was the case with *Rusticus*, the name *Zygaena* as a genus or "Coitus" is dropped in favour of *Thermophila* by the *Verzeichniss*; this, however, is inadmissible, and the genus *Thermophila* must sink as a synonym of the earlier *Zygaena*.

Throughout both works the plural is first used and the singular then follows with the citation of the specific name, so that if common sense says "no" to the adoption of the singular use in the *Tentamen* it must without any question do the same with the *Verzeichniss* as well.

Taking into consideration all these facts it seems to me quite clear that in the *Tentamen* Hübner was dealing with what we now call genera quite as much as in his later work, only in the latter he had had time to develop his terminology to a greater extent.

The more healthy criticism we get (like this of my kind friend) the better, for it is only thus that we shall arrive at the correct solution of the matter.—G.T.B.-B.]

NOTES ON COLLECTING, Etc.

MARRIAGE FLIGHT OF A RARE ANT IN LONDON.—The ant, *Myrmecina graminicola*, Ltr., is one of the rarest of our British species, and there-

fore its appearance in a back garden at Kensington is unusual. In the afternoon of September 9th last I found seven alate females on the flagstones in my garden, and later the same day I actually saw others coming out of a hole between the stones. The next two days about twenty more appeared, so that altogether I captured about thirty. Several climbed up some steps and attempted to fly. It is curious that no male or workers were seen. It is clear that the nest must be under the stones, as the ants kept coming out and going into the same hole. My first acquaintance with this species was in August, 1897, also under flagstones, but in a garden in Oxfordshire, where both workers and a déalated female were found. Two of the females taken last September were confined in an artificial nest, and removed their own wings, so I am in hopes they are fertilised and will succeed in founding a colony. —W. C. CRAWLEY, 29, Holland Park Road, W.

GLoucestershire LEPIDOPTERA:—In continuation of my notes on unrecorded Gloucestershire Lepidoptera, I find I can add the following species, all from the neighbourhood of Stroud. *Catoptria nimbana*, June 6th, 1912, taken off a beech trunk; *Ochsenheimeria vaculella*, July 11th, 1919, by brushing with a sweeping-net the dead twigs of a large oak; *Aristotelia unicolorella*, July 3rd, 1916, and *Coleophora paripennella*. June 11th, 1910, netted early evening; *Nepticula atricollis*, June 3rd, 1918, and *N. ulmivora*, May 30th, 1918, bred from larvae on Crab and Elm, respectively.

The Tortrix had been for some time among my puzzles, but getting another example this year I showed it to the Rev. J. W. Metcalfe, and he recognised it as *nimbana*, and subsequently compared a specimen with his own types. This interesting insect has previously, I think, only been captured in Bucks., but its presence here is not surprising as the food-plant, beech, may be considered the typical forest tree of the district.—W. B. DAVIS, 5, Rosebank Villas, Churchfield Road, Stroud, Glos. September 15th, 1919.

COLLECTING IN FRANCE AND ITALY IN 1917-18 (concluded).—September 17th.—The precious days of this busy month are flying fast. This afternoon the collecting weather conditions in the bed of the Scrivia were again perfect, and the presence of a fairly strong wind lessened the heat of the sun on one's back, and also compelled insects to settle frequently. But a sun helmet is still an essential even at this date, as the glare of the sun on the stony white river bed is very strong. *Plusia gamma* was in abundance on the hawkweed flowers, and *Sesia stellatarum* was swarming. Two more summer form of males of *Mantis religiosa* and one male of the brown autumn form were taken at widely different altitudes, and the sight of another in the wood near the "Bluff" shows that the species is well established in this rich entomological district. Among the numbers of *C. edusa* and *C. hyale* seen to-day was a good var. *helice*, which I took, the first I have met with here.

September 21st.—After some rather windy weather this afternoon was an entomological opportunity, and under a blazing sun I again collected among the flowers up and down the river bed. The females of *C. edusa* were as numerous as ever and I secured two more var. *helice*. A fine female *Issoria lathonia* escaped me, but *Polygonia*

c-album was captured. The large dark race of *P. brassicae* were still on the wing, and I saw two *Catocala nupta* on the rocky clefts where *C. electa* was so numerous in July and August last. Amongst the Orthoptera swarming in the dry river bed I took two males and a female of the brown autumn form of *M. religiosa*, and after some patience secured three fine *Stethophyma fuscum* with a number of *Ædipoda caerulescens*. In the garden I took a fine female of the dragon-fly *Aeschna cyanea*, which had been haunting it for some days, and a male *Gryllus sylvestris*.

September 26th.—After the heavy thunderstorms on September 22nd and 23rd, the Scrivia was flowing again for the first time since July, but after another storm on the 25th the sun came out again brilliantly. The recent rain brought down a good deal of water, which was decreasing to-day, and had left considerable deposits of mud in the bed of the river, around which insect life was teeming in the afternoon. Orthoptera rose at every step. I took three more var. *helice* and the brown form of the Mantis, as well as a fine female *C. nupta*, on the rocky cleft. *Pyrameis cardui* were in scores on the hawkweed flowers, while *Pontia daplidice* was lessening in number, females *I. lathonia* were common with a few of *Pararge megera*. The great heat prevented one from doing much.

September 30th.—In the teeth of a strong equinoctial gale this afternoon I roamed along the river bed, and although the water is now continuous, the beds of flowers are still quite accessible. The *Colias* species were still plentiful and fresh. As the Orthoptera were in thousands, I was led to pay considerable attention to this group during October.

October 2nd.—Last night some very fine dark brown, almost black, imagines of *Xylophasia monoglypha* came to the electric light. This species is usually on the wing in June and July, and those taken in October would appear to be a second emergence. It is not common in N. Italy. I was given a fine larva of *Agrius convolvuli*, which fed readily on both *Convolvulus sepium* and *C. arvensis*. This species is quite common in North Italy, and is on the wing in April and September and October.

October 6th.—This afternoon of a perfectly still day with a bright sun all nature in the wide river bed was alive. The Scrivia was flowing in three separate streams since the recent thunderstorms, but I was able to ford them all by stepping-stones. Again the Orthoptera rose at every step, conspicuous among them being *O. caerulescens* and *Sphingonotus caeruleans*. *P. cardui* were getting worn, *P. daplidice* were abundant, *C. edusa*, though less numerous, was very perfect, mostly females, only one Mantis was noted, the large *S. fuscum* rose at intervals, and under the *C. electa* clefts I took two *Deiopeia pulchella* among low plants. *C. nupta* was on the tree trunks in the outskirts of the wooded bottom quite plentiful, fluttering from trunk to trunk and settling a short distance from the ground. Just outside the wood here a few dragonflies were seen, and I took *S. striolatum* male, and *S. scoticum* female. I had a larva of *Dasychira pudibunda* brought me to-day, which spun up immediately among the leaves of apple which it readily feeds upon. Just inside the first gorge near Vocemola the beetle *Adimonia tanacetii* was taken.

October 8th.—Despite the strong wind to-day a number of butter-

flies were flying in the bed of the river. *C. edusa*, *P. daplidice*, the Orthopteron *O. caerulescens* were taken here. In the wood *Phaneroptera falcata* was captured. Summer and autumn forms of Mantis were in the dry bed of the stream behind the woods. On the top of the bluff and on the way down the beetle *Meloë proscarabaeus* was taken. At night thunderstorms again affected the flow of water in the Scrivia river.

October 17th.—We have had continuous rains and thunderstorms day and night since October 12th, and the ground is very sodden, the three main channels of the river are now getting very full of water. Last night *Calocampa exoleta* came to light accompanied by several *Miselia oxyacanthae*, and one specimen of *Ennomos alniaria* (*tiliaria*).

October 20th.—Last evening *Triphaena pronuba* came to light. This afternoon collecting was done in a very strong breeze on the high ground near the cemetery behind Vocemola. A male and a female of *C. edusa* were found resting on young oak-trees with their wings closed, exactly matching the half changed leaves around them, thus rendering them practically invisible. The *Xylocopa* bee was noted on the sunny side of the gorge with *P. brassicae*.

October 23rd.—Along the main road running through the village of Rigoroso, this afternoon, I found the larvæ of *Macrothylacia rubi* walking about in all directions. A *P. brassicae* was seen asleep resting sideways on a stone wall, and thus rendered particularly visible by its general light coloration contrasting with the much darker stone, whereas had it rested at right angles with closed wings it would have been quite invisible. The heavy rain came on again this evening, and fine fresh *Miselia oxyacanthae*, a couple of *Himera pennaria*, and the late emergence of *Noctua plecta* came in to the electric light.

October 25th.—The sun broke through in the afternoon and it was pleasant walking. I crossed the river and turned down the right bank, where a worn specimen of the Orthopteron *Acrida nasuta* was taken. In the first stage I took a pair of *Sympetrum striolatum* in cõp flying up and down the stream in full current again. *C. edusa* were resting among leaves on the dry pasture, perfectly resembling them with their closed wings. Among some small trees I took the smaller dragon-fly *Ischnura pumilio*. A female *Gryllomorpha dalmatina* was taken in the dry pasture.

October 26th.—A glorious summer afternoon after the torrents of rain. I crossed the bridge over the river and turned up the river bed for some distance. Only a few blossoms of the hawkweed remain, but even these attract the few *C. edusa* to them. The Orthopteron *Stauroderus morio* were numerous among the stones and low shrubs, and I took the large yellow-brown Orthopteron *Chorthippus pulvinatus* as it was sitting on a stone facing me as I turned suddenly. Leaving the stream past the village of Vocemola I turned up through the clump of trees on the lower hillsides where *P. rapae* and a solitary specimen of *Pararge megera* accompanied the *C. edusa*.

October 28th.—There is very little insect life left along the river bed now, the additional species to-day was a *Pontia daplidice*. Quite a number of dragonflies were flying along the little stream which comes down from behind the "bluff." *Sympetrum striolatum* were taken in cõp, and the females were easy to take as they were ovipositing on the young shoots and blades of grass just below and on the surface of the water.

October 29th.—The thermometer down to 51° F. in the shade, but a bright sun and no wind afforded a pleasant afternoon's walk up the river bed, where *Stauroderus morio* was stirred up to be caught among the *Calluna* growing on the bank. *Pieris rapae* appeared to be a fresh emergence in number, and *C. hyale* in poor condition was among the abundant *C. edusa*. *Rumicia phlaeas* were in good order and a female *P. megera* turned up with *P. daphnidice*. The interest of the afternoon was the capture of two good specimens of *Lampides boeticus*, an addition to my list of the butterflies of this district. Evidently I missed the summer brood (possibly the middle of June) owing to the great heat, as the place where I met with the species to-day would then have been practically unbearable. This morning on a stone wall in the sun behind the villa Vittoria I found a specimen of the Noctuid *Chariptera viridana*, a rare moth in N. Italy, probably a second brood, the usual emergence being June and July.

October 31st.—South wind and a warm sun produced a perfect afternoon. Another *L. boeticus* was taken in the same place, but I saw no more. *R. phlaeas* and *C. hyale* with the usual *C. edusa* were the chief Lepidoptera seen. A specimen of *Oedipoda miniata* fell to my net. This morning a fresh example of *S. stellatarum* was handed to me by my friend, Major Broadmore, which he had taken at Bordighera on the Italian Riviera.

November 4th.—Last night both sexes of *Himera pennaria* came to light in abundance at the villa Pisano during the heavy rain with a few *Ennomos alniaria* (*tiliaria*), *Odontopera bidentata*, and *Epirrita (Oporabia) dilutata*, all in good condition.

November 6th.—Last night the pretty Orthopteron *Phaneroptera falcata* jumped into my bedroom, and a *Phlogophora meticulosa* came in to light.

November 9th.—I left for England and before concluding I wish to express my indebtedness to the following authors, whose books were consulted constantly.

Italian Hymenoptera, Neuroptera, and Orthoptera, by Dr. A. Griffini. Ulrico Hoepli. Milan. 1897.

A Synopsis of the Orthoptera of Western Europe, by Dr. Malcolm Burr, London. 1910.

British Dragonflies—Odonata, by W. J. Lucas, F.E.S., London. 1899.

Le Farfalle, by Proff. Ferdinando Sordelli. Ulrico Hoepli. Milan. 1912.

Il libro dei Coleotteri, by Dr. Achille Griffini. Ulrico Hoepli. Milan. 1896.—LIEUT. E. B. ASHEY (F.E.S.), Hounslow.

CURRENT NOTES AND SHORT NOTICES.

The Rev. G. H. Raynor is publishing "A Compendium of Named Varieties of the Large Magpie Moth" accompanied by a Label List. Examining an advance copy we are struck by the enormous amount of really scientific labour which it records. One is perhaps tempted to look upon the insect concerned rather from a commercial than from a scientific point of view. Mr. Raynor's brochure contains descriptions of two classes of variation, those taken wild in Britain, and these produced by careful breeding experiments. As long as a form has

been named, it finds a place in the "Compendium," which becomes thus a sort of "Bradshaw" for the species. Further it is a record which (as far as we know) has no parallel in Entomology, or other branch of Natural History, unless it be Domestic Animals—a record of the possible modifications in appearance, which may be produced by the patient continuous working out of a system of scientific experiment. There is probably no other insect of which a catalogue of 55 different forms could be compiled. Alike to the Collector of Varieties of Lepidoptera, and to the student this list should be indispensable.—C.R.N.B.

The following Fellows have been nominated by the Council of the Entomological Society of London as Officers and Council for the Session 1920-21 and will be elected at the Annual Meeting to be held on January 21st, 1920. *President*: Comm. J. J. Walker, M.A., R.N., F.L.S. *Treasurer*: W. G. Sheldon, F.Z.S. *Secretaries*: Rev. G. Wheeler, M.A., F.Z.S.; S. A. Neave, M.A., D.Sc., F.Z.S. *Librarian*: G. C. Champion, A.L.S., F.Z.S. *Council*: H. E. Andrews; G. T. Bethune-Baker, F.L.S., F.Z.S.; K. G. Blair, B.Sc.; Surg. Comm. M. Cameron, M.B., R.N.; J. Hartley-Durrant; H. Eltringham, M.A., D.Sc.; A. D. Imms, M.A., D.Sc., F.L.S.; G. A. K. Marshall, D.Sc., F.Z.S.; Rev. F. D. Morice, M.A., F.Z.S.; H. E. Page; Rt. Honble. Lord Rothschild, M.A., F.R.S., etc.; Capt. Rev. J. B. Waterston, B.D., B.Sc.

The following is a List of Members recommended by the Council of the South London Entomological Society to be appointed Officers and Council for the Season 1920-21 at the Annual Meeting to be held on January 22nd, 1920. *President*: K. G. Blair, B.Sc., F.E.S. *Vice-Presidents*: E. J. Bunnett, M.A., F.E.S.; S. Edwards, F.L.S., F.Z.S., F.E.S. *Treasurer*: A. E. Tonge, F.E.S. *Librarian*: A. W. Dods. *Curator*: W. West. *Assistant Curator*: S. R. Ashby, F.E.S. *Editor of Proceedings*: H. J. Turner, F.E.S. *Hon. Secretaries*: S. Edwards, F.L.S., F.Z.S., F.E.S. (Corresponding), and H. J. Turner, F.E.S. *Recorder of Attendances*: B. S. Williams. *Hon. Lanternist*: A. W. Dennis. *Council*: R. Adkin, F.E.S.; R. T. Bowman; L. E. Dunster; F. W. Frohawk, F.E.S., M.B.O.U.; Lachlan Gibb, F.E.S.; T. W. Hall, F.E.S.; N. D. Riley, F.E.S.; Dr. G. C. Robertson, M.D.; E. Step, F.L.S.

While searching through "volumes of forgotten lore" we recently came across the following poetical (sic) gem apropos of the malarial guest. Dr. Koch, the German Professor, had gone to Java and the fact was thus reported in the *Singapore Free Press*.

Koch has settled down in Java for to find a febrifuge;
I fancy these Dutch Doctors find the joke exceeding huge,
Trotting round the swamps malarious; laying in a buzzing stock
Of the Javanese mosquito for the febrile Doctor Koch.
I have oft gone butterflying for the beetle in his lair:
Even hunted "irritations" in my puppy's curly hair:
But these pleasurable pastimes all must go into the shade,
When compared to catching skeeters to find how fever's made.
In my mind's eye I can picture each Dutch doctor setting out,
For the hotbeds of the fever where the skeeters fly about;
Having tended to the dying and interred their dead,—*en bloc*
They troop out to catch mosquitoes for the festive Doctor Koch.
Well! I fancy, if our Governmental medicos were told
To undertake such duties, that they'd quickly quit the fold:
That e'en though it were for Science, they'd be likely thus to mock—
"Go and catch your own mosquitoes and be blowed to you, old Cock."

Prof. Morel says that throughout the summer of 1919 he found Butterflies to be very scarce both at Hyères in late April and in May and at Allos in the Dauphiné Alps from June to August. The same report is sent to us by Signor Querci whose wife and daughter spent the whole summer collecting in many places in Central Italy, butterflies were scarce everywhere. Reports from our own islands are quite the reverse. Have any of our readers continental experience as to scarcity in other parts? Lieut. Ashby certainly found quite the reverse in the northern slopes of the Apennines.

The *Vasculum* for the earlier half of 1918 contains further contributions towards the elucidation of the hitherto much neglected Orders. In "British Hydracarina" Chas. D. Soar says that "the Acarina or Mites are divided into eight super-families, of which Hydrachmoidae is one. This is divided into two families, *Halacaridae* usually found in the sea, and *Hydracarina* usually found in fresh water." He says that in the British area about two hundred and fifty species of forty-two genera have been recorded so far. The writer deals with the general life-history in detail, describes the method of preparation for microscopical examination, and adds a plate with numerous figures to illustrate his remarks. Messrs. R. S. Bagnall, F.L.S., and J. W. H. Harrison, D.Sc., contribute the sixth portion of their "Talk about Plant Galls," on this occasion dealing with the Wasp Galls of the British Oak. They briefly consider (1) the outward forms and position of the galls; (2) the internal form; (3) uninvited guests and others—inquilines; (4) alternating generations; (5) economic considerations, and (6) details of the species found in the Northumberland and Durham area. There are in addition Records of insects occurring locally, short accounts of some eight Field Meetings of the North. and Durh. N.H.S. in 1918, with other matters dealing with Ornithology, Geology, History, and Literature.

Many Annuals have been late in appearance and curtailed in size this year, no doubt caused by the excessive expense in all matters dealing with the production of books and papers. The *Transactions of the London Natural History Society* for 1918 is one more record added to the work which has been going on for more than sixty years. In Extracts from the Minutes only the most important items of the Proceedings of the meetings are given, including "Mosquitoes" by Mr. Bacot, "Notes from Gloucestershire" by Mr. C. Nicholson, and "Notes from N.E. Ireland" by Mr. H. B. Williams dealing with the Insecta, and various papers and notes on Ornithology and Botany. A "Pocket Box Exhibition" was as usual held in February and many aberrations and local species were shown, particularly of *Agriades coridon*, *Abraxas grossulariata*, and *Rumicia phlaeas*. Much of the work of the Society is carried on by individual effort collected into subject sections, each with an active chairman and secretary. Some ten pages are devoted to reports from these branches. Two papers are printed in full and the Transactions end with biographies of three members who passed away during the year. No reports of the Council, Annual Address, and business statement for the year are printed.

In the *Ent. News* for November is an interesting article by E. C. Van Dyke, "The Tendency of Insects to Collect on Ridges and Mountain Snowfields," giving the writer's experiences on the high

mountains. Among other species and other Orders he notes the fondness of *Papilio zolicaon* and the Alpine Pierids to favour the highest ridges and points, as also vast quantities of *Coccinellidae*. This recalls to mind how certain one is to meet *P. machaon* on the topmost ridges of the Rigi, the Bürgenstock, and other like places in Switzerland, while the Alpine Pierid *P. callidice* frequents the steep ridges near the Eiger-glacier station of the Jung Frau Railways. Prof. Skinner records a fine gynandromorph of *Papilio turnus*, the left side wings normal and the right side wings those of the black female. H. B. Weiss records another immigrant from Europe in *Tinea cloacella*, of which a number have been bred from *Polyporus* gathered from telegraph poles in more than one locality in New Jersey. Dr. Howard furnishes a list of the Hymenopterous Parasites of Kermes, a useful compilation for practical economic purposes.

In the *Ent. Mo. Mag.* for November Mr. H. Mace contributes an article on "Balkan Butterflies."

In the *Rev. Mens. Namur* for November, M. T. Derenne records two unusual assemblages of *Amphipyra tragopogonis* under loosely attached bark on trees which had been thrown down in the citadel of Namur. On one of the occasions in August, 1918, he counted between 30 and 40 specimens massed in one group. The aberration of *Papilio machaon* recorded by Dr. Reverdin in Geneva in 1910 as *ab. melanostida*, with a black streak in the discoidal cell of the forewings, has been bred in some number in Belgium, near Ganshoren.

A new species of British Aphis is recorded in the *Ent. Mo. Mag.* for December, by T. Laing, M.A., as *Aphis tripolii*; it was taken at Shoeburyness on *Aster tripolium* in August. The same writer also contributes a note on "Insects damaging Lead."

In the *Ent.* for November, Prof. T. D. A. Cockerell describes several insects found in Burmese Amber; Mr. W. J. Lucas writes on "Orthoptera in Captivity" and "Preserving Orthoptera"; and Mr. Sheldon tackles some more of the problems in the Genus *Peronea* dealing with *P. maccana* and *P. lipsiana*, of which the larva were obtained from Rannoch.

In his researches into the Biology of the sand *Ammophila* (Hym.), detailed in the *Bull. Soc. ent. Belg.* M. Descy deals in a very interesting manner at some considerable length with the Theory of Paralysis.

Mr. Cyril T. Carpenter, F.E.S., is shortly starting on a tour to the Andes. He writes to say that he is proceeding in a few days to Panama, and from thence proposes to go down the S.W. coast and enter Colombia. The first town he will touch will be Medellín, where he proposes to stay for about a month. From there he will make for Bogota where he will probably stay some time. Then he proceeds to Purificacion; after leaving which he will pass down through Neiva, Popagan, to Pasto, and will enter Ecuador at Ibarra. Then he will go on to Quito, Latacunga, Riobamba, Cuenca and Loja, and pass into Peru at Pongo de Mansericke. From there he expects to go towards the coast and continue on to Lima, from whence he will reach Cuzco and enter Bolivia at La Paz. He then intends to make a bee-line for Villa Maria, Brazil, and to work through the district of the Matto Grosso to Cataldo and on to S. Rondo, thence following the River San Francisco to its mouth and to embark at Bahia for Colon. Mr. John Ward will forward correspondence.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

October 9th.—NEW MEMBER.—Dr. T. R. Leeson, M.D., J.P., F.L.S., of Twickenham, was elected a member.

ZYGAENIDS FROM S. ITALY.—Mr. Curwen, *Zygaenids* from S. Italy, *Z. rubicundus*, *Z. erythrus*, *Z. stoechadis*, and ab. *dubia*, and *Z. oxytropis*; aberrations of *Z. filipendulae* from Deal; and *Z. tripolii* ab. *minoides* from Swinley Woods.

AN IMMIGRANT LONGICORN.—Mr. Moore, *Monohamus titilata* (Col.) from Rotherhithe.

P. ICARUS, FEMALES OF TWO BROODS.—Mr. Barnett, series of the two broods of female *Polyommatus icarus*, Surrey.

S. AMERICAN LEPIDOPTERA.—Mr. Hy. J. Turner, *Dione vanillae* var. *maculosa*, *Calthodes ethlius*, and *Basilona imperialis*, all from Cordoba, Argentina.

October 23rd.—EXHIBITION OF AND DISCUSSION ON THE VARIATION IN *AGLAIS URTICAE*.—The President introduced the subject by referring to the establishment of the genus *Aglais* by Dalman in 1816.

Mr. Hy. J. Turner read a series of Notes dealing with (1) the features available for variation, (2) the lines of actual variation, (3) the various named forms which fall into these groups, (4) less frequently occurring forms, (5) extremely rare aberrations, (6) a reference list of the named forms, and (7) short diagnoses of these forms.

Mr. Sperring read a series of Notes dealing with (1) racial series from S.E. London, Essex, Cambridge, Lincoln, Tyrone, Inverness, Kincardine, Paisley, and Arran, (2) aberrational and racial variation, (3) characteristics of various named forms which he exhibited, and (4) colour aberration caused by applied chemical action.

S. GIGAS.—Mr. Curwen exhibited *Sirex gigas* from Twickenham.

VARIATION IN *C. GRAMINIS*.—Mr. B. S. Williams, a series of *Charaëas graminis* with variable ground colour and a specimen with coalesced marking.

MELANIC *O. AUTUMNARIA*.—Mr. Tonge, a series of *Oporabia autumnaria* from Langridge Fell and near Preston, including a strongly melanic form.

ABERRATION OF BRITISH NYMPHALIDS. N. TYPHAE TWO YEARS AS A LARVA.—Mr. Frohawk, a small living larva of *Nonagria typhae*, already fourteen months old; a series of *Limenitis sibilla* showing gradation from type form to ab. *nigrina*; *Dryas paphia* with somewhat radiated hindwings, and others showing coalescence and suffusion of spots; and *Argynnis cydippe*, a series showing gradation in extension of the spotting and one with only three spots in the row on the hindwing.

November 13th, 1919.—DECEASE OF A MEMBER.—The decease of Mr. W. J. Ashdown (1895) was announced.

ADDITION TO THE SOCIETY'S COLLECTIONS.—On behalf of the Rev. C. R. N. Burrows, a series of larval cases of various species of British Psychids were presented to the Society's collections.

EXHIBITION AND DISCUSSION OF *N. XANTHOGRAPHA*.—Series of *Noctua xanthographa* were exhibited by Messrs. R. Adkin, A. E. Tonge, B. S. Williams, Hy. J. Turner, etc., and a discussion took place.

Mr. H. J. Turner gave a list of the named forms with short descriptions, and mentioned the characters which were available for variation as the ground, the stigmata, the transverse markings, and the scale textures.

Several members remarked on the extremely large numbers of this species which came to sugar.

ABERRATIONS OF *C. XERAMPELINA* AND *E. ANGULARIA*.—Mr. Newman, a very dark banded large form of *Cirrhoedia xerampelina* from Sligo and males of *Ennomos angularia* from Regent's Park with considerable contrast between the light central band and the dark outer-marginal area.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

October 20th, 1919.—LEPIDOPTERA TAKEN AT CARTMEL.—Mr. R. Wilding had a large number of Lepidoptera from Cartmel including long series of *Argynnis aglaia* and *Brenthis selene*, the latter included a very fine underside variety; he also shewed *Plusia festucae* from the same district.

NOTES ON *B. MURALIS*.—Mr. W. A. Tyerman exhibited, on behalf of Mr. H. M. Hallett of Penarth, a series of *Bryophila muralis* from Cardiff, also *Polia flavicincta*, and contributed notes.

ABERRATIONS OF BRITISH LEPIDOPTERA.—Mr. S. P. Doudney shewed series of *Erebia blandina* (*aethiops*), with a xanthic aberration, *Argynnis cydippe*, very strongly marked underside, *Zephyrus quercus* and *Anaitis plagiata* from Arnside; *Plebeius aegon* race *masseyi*, xanthic aberration, *Agriades coridon*, *Bryophila muralis* and *Gnophos obscurata* from Folkestone.

LOCAL SPECIES AND FORMS OF BRITISH LEPIDOPTERA.—Mr. R. Tait brought *Celastrina argolus* from Penmaenmawr, and reported the presence of larvæ of *Plusia moneta* in the same locality; *Strymon (Thecla) pruni* and *Aplecta advena* from Monks Wood; he remarked on the great scarcity of Lepidoptera in S. Devon and at Wicken.

Mr. J. W. Griffin, *Tephrosia biundularia*, *Ellopiopsis prosapiaria*, *Eupithecia coronata*, *Aplecta nebulosa*, and *Brephos parthenias* from Delamere; *Notodontia camelina*, *N. dromedarius*, *N. ziczac*, *Hylophila prasinana*, and *Euclidia mi* from Simonswood; *Trochilium crabroniformis* and *Agrotis nigricans* from Wallasey.

Mr. S. Gordon Smith exhibited a large number of Lepidoptera, including the type specimens of the recently described aberrations *Crocallis elingvaria* ab. *signatipennis*, Newst. and Smith, *Nyssia zonaria* ab. *ochracea*, N. and S., *Amphidasis strataria* ab. *ochrearia*, N. and S., and *Tephrosia biundularia* ab. *venosa*, N. and S. From Chester, chiefly taken at light, *Coenobia rufa*, *Cirrhoedia xerampelina* and *Calamia lutosa*; from Delaware, *Nonagria geminipuncta*, captured by Prof. Newstead and new to the L. and C. List. A series of *Callimorpha dominula* from Aberhosan, N. Wales; from Prestatyn, a series of *Cosmotriche potatoria*, including two dark females and a male having three of the wings dark, the other, right forewing, being yellow.

Mr. W. Mansbridge brought a long series of *Sarothripus recayana* from the New Forest, which included the aberrations *variegata*, *adusta*, *afzeliana*, *fasciata*, *fusculina*, *melanosticta*, *ramosana* and *stoninus*; *Plebeius aegon* from Holker and Witherslack, *Hydrelia unca* from Holker, *Cydaria truncata* and *Cosymbia (Zonosoma) pendularia*

var. *decoraria* (*subroseata*) from N. Staffs, also a fine radiate aberration of *Rumicia phlaeas* from Ainsdale.

Mr. Prince had a very fine lot of *Agriades coridon* comprising ab. *semisyngrapha*, ab. *striata*, and other forms.

November 17th, 1919.—NEW MEMBER.—Mr. H. M. Hallett, F.E.S., of 64, Westbourne Road, Penarth, Glam., was elected a member of the Society.

NEAR EASTERN LEPIDOPTERA.—Mr. A. W. Hughes brought an exhibit of Lepidoptera from Palestine and Egypt, and described the difficulty of collecting under service conditions and also of getting the insects safely home.

ABERRATIONS OF A. THETIS AND SERIES OF EXOTIC SPHINGIDAE SHOWN.—Mr. H. B. Prince exhibited a large number of *Agriades thetis* (*bellargus*), which included abs. *striata*, *arcua*, and other forms; also a collection of *Sphingidae* bred by the Rev. A. Miles Moss in Colombia, S. America.

REVIEWS AND NOTICES OF BOOKS.

PROCEEDINGS OF THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, 1918-19. 124+xv. pp., 2 plates and Text figure.

The Volume presented for Review is a very substantial one, marking, one presumes, the end of War-stress, the increased supply of (excellent) paper, and above all, the return of our men and Members of Societies to their pre-war occupations.

The pagination of the present issue 124+xv. pages, compared with 85+xv. in the last, is indeed rather startling when one puts the volumes side by side.

The Society's Membership has been again well sustained, totalling 157 against 158 of last year's return, in spite of the loss of 5 by death and 2 by resignation. This maintenance of numbers betokens a healthy life and abundant vigour.

The Report of the Council chronicles the renewed activities. Eight formal Papers read, two special Lectures and five Field Meetings provide ample material for interest and observation.

There is a difference between a Critic and a Reviewer. The Critic is supposed to, indeed generally does, find fault [wisely has it been written that a Critic is one who is bereft of the power to construct], the Reviewer, to commend and praise. This Reviewer is therefore anxious to be understood when he begins his remarks by picking a little hole in Mr. H. J. Turner's Paper upon *Ematurga atomaria*, L., which it need scarcely be said is in itself a most interesting, instructive, and lastingly useful contribution to Entomological Knowledge. Mr. Turner has allowed a little confusion to escape his notice and forgot that his Paper would come under the notice of "one who knows." The trouble is concerning the inclusion of a form var. *glavearia* as a variety of *E. atomaria*. It would appear from his words that he was completely certain himself that the suggestion was incorrect, but does not quite make his position clear. The writer has not had opportunity to examine the material at the British Museum, or elsewhere, so cannot say how "or why" the mistake arose. Probably there is some considerable resemblance between the species, but as a matter of

fact *glarearia* is not in any way related to *Ematurga*, but a very well defined *Macariid*, allied to *clathrata* and to *Macaria*. As our friend notes, *glarearia*, in Staudinger's Catalog, 1901, is placed next to *clathrata* in the genus *Phasiane*. Where the reference to Haworth comes in is a mystery, as *glariaria* is not a British insect. It was submitted to the writer some years ago, probably by Mr. Prout, for investigation, doubtlessly on account of this confusion, and was at once placed in its proper position. So much for genitalia. "But to return to our mutttons."

Perhaps after this outburst of criticism, our senses are quickened, but to find Alfred Sich describing himself as a "Beginner" in the study of *Tortricina*, does seem a "bit thick." Maybe we are wrong on this point, but in our ignorance we have thought that our old friend knew as much on the subject as most students of the group long before some of us were born.

Here a very serious trouble meets the Reviewer. The volume under notice is thick, but the editor of *The Record* is urgent. Time (and also space) is short. We don't like the appearance of "scampering," and don't want to appear careless or unappreciative. This must be our excuse for brevity.

The Paper by the Rev. G. Wheeler on the variation of *Epinephele tithonus*, with two nice photographic plates, is more than a mere catalogue of known forms, as the title suggests, but is a careful comparison of this species with other allies.

The Presidential Address [Mr. Stanley Edwards] forms a useful compendium of facts about injurious and beneficial *Insecta* under the title of "Economic Entomology."

The Abstract of Proceedings is too extensive to summarise, too varied to deal with in detail. The exhibits continue to be numerous (increasingly so), especially at the Annual Exhibition, thirteen pages of the Proceedings being occupied by the list of objects, with brief explanatory notes thereupon.

We notice in turning over the pages numerous very interesting notes on various species of *Lepidoptera*. Mr. L. W. Newman on the variation amongst bred specimens of *Cosymbia pendularia*. Mr. B. W. Adkin on the genus *Spilosoma*. Mr. Sperring's Notes on *Mimas tiliae*, practically a life history—with notes on the variation. Mr. Blair's table of differentiation between *Coccinella 7-punctata* and *C. distincta*. Mr. Bowman's "record" of four successive broods, including the wild mother, in one year, of *Dysstroma truncata*, is of peculiar interest, in connection with the usual complaint as to deterioration resulting from inbreeding, and also on account of the disappearance of variation.

The Annual Exhibition of Orders other than *Lepidoptera* must not escape notice, and appears to have been loyally supported, as it well deserves to be, if only to remind Lepidopterists that there are forms of life other than butterflies and moths.

The Reviewer's own practical experience of the aggravating, soul disturbing, nature of the work of index making (usually within a strictly limited period of time) inclines him to bear gently with those who undertake a most thankless business, and discount criticism upon the accuracy thereof, desirable though that be, until he knows that the critic is one who is capable of constructing himself.—(Rev.) C. R. N. BURROWS.

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The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—*Hon. Sec.*, Stanley Edwards, 15, St. German's Place, Blackheath, S.E. 3.

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Comparative data and statistics on some *Zygaenae* of Peninsular Italy.

By ORAZIO QUERCI.

I. *ZYGAENA TRANSALPINA*, Esp.

The Italian *Zygaenae* have been made the subject of accurate studies by many entomologists, who have described species, races, and many individual forms. Being in possession of abundant materials I propose to furnish, above all, exact statistics, and to make observations in order to establish, on real numerical bases, the frequency of the particular forms in the races of Central Italy, leaving to Dr. Verity the synthetic comparative study of the same races, and their nomenclature.

The specimens which I possess come chiefly from the following localities, in which my family have collected during the last ten years:—

1. Florence, Tuscany, Central Italy.—Grassy clearings in the oak coppices of the Pian di Mugnone (600 ft.) and of the Fiesole hills (1,700 ft.).

2. Fonte-buona, Florence.—Meadows on the slopes of Poggio Conca (1,200 ft.), near Monte Morello.

3. Palazzuolo di Romagna, Tuscany.—Meadows at about 1,000 ft., amongst the oak woods on the slopes of Monte Carsolano.

4. Montefegatesi, Lucca, Tuscany, Central Italy.—Uncultivated ground on the slopes of Monte Pratifiorito (3,000 ft.).

5. Firenzuola, Florence.—Clearings at about 1,500 ft. above the sea, in the locality called il Palasaccio.

6. Macerata, Marche, Central Italy.—Clearings in the oak woods of Colle Torri (900 ft. above the sea).

7. Bolognola, Macerata.—Bare slopes and clearings among the beech woods on the Sibillini mountains (3,600 ft.).

8. Formia, Caserta, Campania.—Grassy hills near the Gulf of Gaeta (150 ft.).

9. Pollecca, Caserta.—Clearings among the oak woods on the Monti Aurunci.

10. Villalattina, Caserta.—Meadows and thickets along the road which borders the Mollarino river (1,500 ft.), in the Mainarde hills.

11. Aspromonte, Calabria, South Italy.—Clearings and meadows on the plateau of Carmelia (2,000 ft.).

12. S. Martino, Palermo, Sicily.—Grassy dells among the bare slopes of Monte Cuccio and Monte Pietroso (2,500 ft.).

I begin with *Z. transalpina*, which is the most interesting of the Italian *Zygaenae*, on account of the numerous varieties and individual forms which it produces, and I give the data and statistics of the four varieties of which I possess a sufficient number of specimens.

Zygaena transalpina, Esp. flies at the end of June or in the first days of July at Florence, Fontebuona, Palazzuolo, Firenzuola, Macerata, Pollecca, and Villalattina; at Formia it begins to appear in January and flies in March; at Bolognola it first appears in July and re-appears in September. It has not been found in the other localities above mentioned.

In the following synopsis the principal characteristics of the variation of each race are indicated, and for each characteristic the number of specimens found in each of the four localities above mentioned is marked. For the locality of Villalattina I have divided the data into three columns according to the colours, red, yellow, or rose, of each specimen. (See table I.)

The numbers in large letters of table I. are the ordinal numbers of the forms, and refer to the following list, in which are mentioned the names which have been ascribed to some of the different individual forms.

Besides the 53 different forms to which I have alluded in the table, *Z. transalpina* produces also other accidental forms the following of which deserve to be noted :—

The abdomen, generally of dark blue colour, may be adorned by a red circle (*annulata*, Trti). Of this aberration I have found four specimens amongst about 4000 examined at Formia, and one amongst 500 individuals examined at Florence. [The existence of this form is to my mind important, because it seems to shew that the Asiatic *Z. dorycnii*, O. is but a sub-species of *Z. loti*, just as *transalpina* is another. It will be noticed that, but for the abdominal belt, *dorycnii* is identical with some forms of *transalpina*, including position of red spots on forewing.—R. VERITY.]

Upon the dorsal margin of the hindwings and on the external angle of the same, there may be a shading more or less intense of golden scales (*adflata*, Trti). I have found twelve specimens with this characteristic well-marked amongst the *Z. transalpina* of Formia, and one amongst about 400 specimens examined at Polleca, on the Monti Aurunci.

The upper basal spot may extend along the costa until it joins the median upper spot (*anticeconjuncta*, Vrt.). One specimen out of more than 300 examined at Bolognola, on the Monti Sibillini.

Whether in the plain or on the hills *Z. transalpina* has only one and continuous period on the wing, and then disappears. On the high mountains, on the contrary, it flies in July, ceases to fly in August, and then re-appears in September. The September specimens are generally smaller and more faintly coloured than those of July. I think I can explain this phenomenon excluding the hypothesis of a second generation. In the higher parts of the Apennines the grass is cut in the middle of July; the less grown larvæ of *Z. transalpina* are thus deprived of food and must travel about to find it. In this way their development is retarded, and the chrysalid is overtaken by the period of intense heat and absolute drought, during which nearly all the species of Lepidoptera cease to fly. After the rains the surviving chrysalids complete their development, but having suffered the difficulties of life, are of reduced dimensions and poor in scales. Similar specimens have often been produced amongst those which I had neglected in the breeding cages.

The appearance of not a few specimens of *Z. transalpina*, which happens in January and February at Formia, as well as their normal period of flying in March, is most extraordinary, and all the more notable when you consider that in northern Africa the *Zygaenae* fly in May and June.

TABLE 1.—Statistical Table of the Chief Variations of *Zygaena transalpina*, Esp.

Ordinals of the variation.	Upperside.		Underside.		Florence.		Bologna.		Formia.		D.		Villatina.		
	Forewing. Number of Spots.	Hindwing. Dark marginal scaling.	Forewing. Number of Spots.	Hindwing. Dark marginal scaling.	♂ A. Bright red.	♀ A. Bright red.	♂ B. Pale red.	♀ B. Pale red.	♂ C. Bright red.	♀ C. Bright red.	♂ D. Bright red.	♀ D. Bright red.	♂ E. Yellow.	♀ E. Yellow.	
1	Six. (*)	About 1 mm. in width.	Six confluent spots.	Restricted to outer mar-	1	8	6	9	10	6					
2	do.	do.	Six more or less con- fluent spots.	do. [gin.	1	17	1	3	5	3					
3	do.	do.	Six isolated spots.	do.	6	—	1	1	8	5					
4	do.	About 1 to 2 mm. in width.	Six confluent spots.	About 1 to 2 mm. in width.	—	—	5	7	5	8	1	—			
5	do.	do.	Six more or less con- fluent spots.	do.	6	1	7	6	51	21					
6	do.	do.	Six isolated spots.	do.	9	2	5	1	41	10	2	3	5	—	
7	do.	Extending to dorsal margin.	Six more or less con- fluent spots.	do.					12	2					
8	do.	do.	Six isolated spots.	do.											
9	do.	Extends nearly to the entire wing.	Six isolated spots.	Extends nearly to the entire wing.			1	1	10	1	2	6	4	9	
10	do.	Leaves only one cen- tral spot free.	do.	do.							14	5	3	6	
11	do.	Extends over the whole wing surface.	do.	do.							50	33	15	3	
12	Five.	About 1 to 2 mm. in width.	Six more or less con- fluent spots.	Leaves only one cen- tral spot free.					18	—	9	5	2	1	
13	do.	do.	Six isolated spots.	About 1 to 2 mm. in width.							3	—			
14	do.	do.	Five spots.	do.					16	—					
15	do.	Extending to dorsal margin.	Six isolated spots.	do.					3	1	1	—	1	—	
16	do.	do.	Five spots.	do.					5	—					
17	do.	Extends nearly to the entire wing.	Six isolated spots.	Extends nearly to the entire wing.					1	—	12	1	5	1	
18	do.	Leaves only one cen- tral spot free.	do.	do.							59	9	15	2	
19	do.	do.	Five spots.	do.							3	—	8	—	
20	do.	Extends over the whole wing surface.	Six isolated spots.	Leaves only one cen- tral spot free.							9	—	5	—	
21	do.	do.	Five spots.	do.							9	—	3	—	
22	do.	do.	do.	Extends over the whole wing surface.							1	—			
					23	28	26	28	185	57	175	62	66	22	3
														3	

(*) In the races of Formia and Villatina the sixth (apical) spot tends to be reduced in extent in the majority of the six-spotted individuals.

Nomenclature of the variation mentioned in Table I.

[The ordinal numbers and letters correspond to those in the Table.]

A. Race of Florence: *intermedia*, Rocci.

B. Race of Bolognola: *altitudinaria*, Turati.

* C. Race of Formia: *transiens*, Rocci:—

1-3. Unnamed forms transitional to *emendata*, Vrtý. (15%).

4-6. Forms similar to those of race *maritima*, Oberthür (56%).

7-8. Variations of form *pseudomaritima*, Turati (10%).

12-13. Form *maritima-trinaculata*, Obth. (14%).

14. Form *depuncta*, Trti. (2%).

15. Form *pseudosorrentina*, Trti. (2%).

16. Form *pseudosorrentina-depuncta*, Trti. (only one specimen amongst about 3,000 individuals which have been examined).

Race of Villalata: *latina*, Vrtý:—

D. Bright red colour:

4-6-8. Variations of form *sorrentina-sexmacula*, Dz. (4%).

9-10. Unnamed red forms (31%).

11. Form *calabrica-hexamaculata*, Trti. (4%).

13-15. Form *sorrentina*, Stgr. (1%).

17-19. Unnamed red forms (26%).

20-22. Variations of form *calabrica*, Calb. (6%).

E. Yellow colour:

6. Form *flava*, Dz. (2%).

8-10. Form *xanthographa*, Germ. (12%).

15. Unnamed form.

17-19. Form *boisdurvali*, Costa.

20-21. Variations of form *zickerti*, Hoff. (5%).

F. Pinkish colour:

9-11-18. Form *rhodomelas*, Trti.

On the Geographical Variation of *Zygaena loti*, Wien. Verz. subspecies *transalpina*, Esp.

By ROGER VERITY, M.D.

The magnificent material collected during the last few years in Central and Southern Italy, by Querci and his family, has been more or less a revelation as regards the geographical variation of several species of *Zygaena* in that region. They are extremely variable, and far too many fancy names have been given to individual forms without a notion of their frequency and distribution. Querci has just drawn out a very instructive statistic of the forms of *transalpina* in several races, utilising thousands of specimens he has at hand.

I will now try and make out a brief summary of the races which have proved to be discernible in Italy, making a clear distinction between them and individual variations. This does not seem to have been achieved by any of the authors of Monographs on this genus, such as Dziurzynski and Seitz, who give interminable lists of names of minute variations without furnishing any information as to their frequency and importance.

The nomenclature of this genus is unfortunately extremely intri-

cate, owing to the difficulty of distinguishing even the species from each other and the blunders which have ensued. Even at the present time it needs quite a long practice to utilise the knowledge that has been acquired on the subject; for instance, I rarely receive a series of *filipendulae* and of *loti* from localities where they fly together, in which the specimens have been properly separated, and in as recent a work as *Die-schmett. Europas.* of Spuler, one finds at pl. 77, fig. 18a, a *transalpina* figured under the name of *stoechadis* var. *dubia*! An unmistakable character which distinguishes all the subspecies of *filipendulae* from all those of *transalpina*, no matter how similar to each other they may be in certain regions, is the position of the hind row of red spots of the forewing as compared to the corresponding spots of the fore-row; the former in *transalpina* are always situated more outwardly; and a line drawn parallel to the direction of the body through these spots does not pass through the spot which stands in front of it, as it does in *filipendulae* and in its subspecies *stoechadis*. No author seems to have noticed this character, which is the only really constant and reliable one, to my knowledge, the thickly scaled and extensive red patch of the underside of the forewings of *loti*, which distinguishes the two species in Central Europe, being so often reduced or absent in the Italian *transalpina*.

I must take this occasion to note first of all that, if I am not wrong, the specific name of the *Zygæana* in question has not yet been established correctly according to strict rules of priority! It has always been called *transalpina*, but in the second vol. of his *Eur. Schmett.*, in which Esper creates this name, this author also publishes the figure of a *Zygæana* under the name of *loti*, which certainly is the little Central European subspecies of the same species, and he says in the text (page 224) that the latter name was given to specimens from Vienna by "the Authors of the *System. Verzeichniss der Wiener Schmetterlinge*." This can leave no doubt that the name existed in this well-known list, from which several specific names have been drawn in other instances, some time before Esper published his second vol. with the name *transalpina*. Also Hübner refers the name *loti*, not to Esper, but to "d. Ther.," that is to say to the Theresians, who are the authors of the Vienna List. I conclude that the specific name should be *loti*, and that the nymotypical group of races of Central Europe should bear the same name, whereas the name *transalpina* should be restricted to the South European subspecies or group of races.

The name *astragali* is purely a synonym, created fancifully by Borkhausen, and so is *hippocrepidis*, first used by Hübner in his text, and then taken up by Stephens and by Herrich-Schäffer.

I do not intend dealing here with the group of races of Central Europe, distinguished by their small size, frail build, and extent of red scaling, especially on the underside of the forewings; suffice it to mention that the following races have been distinguished: *occidentalis*, nymotypical, *centralis* (*provincialis*), and *ALPICOLA*, *mihi*. The name last mentioned I propose using instead of the name *alpina*, which Boisduval has given first to a *filipendulae* and then to a *loti*; the other races mentioned have been described by Oberthür. The Alps and Pyrenees race *alpicola*, evidently belongs to the same subspecies, on account of the development of the red scaling on the underside of forewings, but by its stouter build and larger size it is clearly a transition to the subspecies *transalpina*.

Race *emendata*, Vrtý.:—Of the *transalpina* subspecies one race comes nearest to *ALPICOLA* by the extent of the red scaling on underside of forewings; the red spots of upperside are more extensive and the blue-black border of hindwings narrower than in any other race of *transalpina*; on the other hand it unmistakably belongs to it by its larger size, robust build, very bright colouring, the scaling being thick. I have called it *emendata* [*Bull. Soc. Ent. It.*, xlvii., p. 76 (1915)], because at one time it was thought by Turati and others to be the nymotypical *transalpina*, whereas I have pointed out that Esper's figure clearly, though roughly, represents either *altitudinaria*, Trti., or *intermedia*, Rocci. (*vide antea*). It is widely distributed in the Po valley and lower localities of the Alps (Como-Brunate, Valcamonica at Cogno, Limone in Piedmont), and even extends to Central Italy along the Adriatic (Macerata).

From this race *transalpina* may be described as branching off into two groups: (a) the small, frail, thinly scaled and less bright mountain group of races, and (b) the maritime group, with exactly opposite characters. In each of these two groups the races may be classified, according to the extent of the blue-green scaling, as follows:—

(a) *intermedia*, Rocci.; *altitudinaria*, Trti.; *sorrentina*, Stögr.; *latina*, mihi; *calabrica*, Calb. (to this group seems also to belong *hispana*, mihi).

(b) *maritima*, Obth.; *transiens*, Rocci.

Race *intermedia*, Rocci.—Between *emendata* and *altitudinaria*, there exists a race which is intermediate in build and which, in extreme individuals, is identical either with *emendata* or with *altitudinaria*, according to localities, thus leading gradually up from one to the other. Also its distribution proves it is intermediate. It spreads all over the Po valley, especially south of this river, where it is less localised than *emendata*; in Liguria, Rocci found it at median altitudes, above *maritima*, Obth., and below *altitudinaria*, Trti.; in Tuscany it is the only representative of the species, both on the sea coast (Leghorn) and in the plains and low hills of the hinterland, so that it constitutes there a very definite race, only blending with *altitudinaria*, Trti., in the higher mountains. Rocci has called it *intermedia*.

Race *altitudinaria*, Trti.—Small, reaching the smallest size of *transalpina* in extreme individuals, such as those who emerge late (autumn), but are probably not at all a second brood [*autumnalis*, Vrtý.]; antennæ thin; body frail; wings narrow; red spots pale; red patch on underside of forewings generally absent in male and very reduced in female; dark scaling of a decided green tinge, and light enough to show off black circles round red spots; dark band along margin of hindwing very narrow. This race extends from Liguria to the Abruzzi, all along the tops of the Appennines, and also in lower mountain localities, when they are particularly cold.

The race described above varies comparatively very little in single individuals; they all belong to the six-spotted form, with narrow dark margin to hindwing; only occasionally does it get a little broader and diffused in *intermedia* and *altitudinaria*; Costantini has observed in the Modenese that this happens chiefly in early emergences and he has called these specimens form *præcox*.

These races are equivalent to the nymotypical group of races of *Z. filipendulae*, L. The following ones are characterised by a

greater extent of the dark scaling, which often reduces the spots of forewing to five, and which tends to invade the whole hindwing and the underside of the forewing, conferring a much more variable look to the individual forms of each race. They correspond to the dark *stoechadis* sub-species of *filipendulae* and group *b* also has the same robust structure. The mountain melanotic forms of *transalpina* have been called *sorrentina*, Stdgr., and *calabrica*, Calb., the latter having the whole of hindwing darkened and the former being a transition, with a broad space left free of dark scales. These forms occur together and occur mixed with transitions to *altitudinaria* in very variable proportions, according to localities, so that local races are produced having on the whole very different aspects. To give a name to every gradation would be impossible and quite useless, but we can agree on a few names to designate the principle types of variation and then use statistical data to better define the races of the various localities.

Race *sorrentina*, Stdgr.—There are regions in which variation extends from *altitudinaria* to *sorrentina*, extreme specimens of these forms being frequent, but the majority consisting of a form similar to *altitudinaria* with the difference that the dark border of the hind-margin is broad, or very broad, and sends out rays towards the dorsal margin, such as are never seen in *altitudinaria*; the five-spotted form also occurs occasionally; the size of the insect is on the whole a little larger and the very small individuals of *altitudinaria* are not produced. To these races I should give the name of *sorrentina*, extending it to those in which *calabrica* does occur, but in a very small percentage. This is the case in the Sorrento Peninsula; at Polleca, in the Aurunci Mountains, *calabrica* does not exist at all. This race is proper to the extreme southern portion of Central Italy and to Southern Italy, and we were very surprised when Querci in 1915 found it as far north as Northern Tuscany on Pratofiorito, 1,000 m., and at Montefegatesi, 700m. (Lucca). Here *altitudinaria* has an unusually broad marginal band and extreme specimens are identical with nymtypical *sorrentina*.

Race *calabrica*, Calb.—The races in which this form is found in a very high percentage, which sometimes is over 50%, and the remainder consists of *sorrentina*, should, I think, bear this name.

Race LATINA, mihi.—In the Mainarde Mountains, at Villalatina, and along the road from Atina to S. Biagio Saracinasco, a magnificent race is found, more variable than any other; Querci's statistical table illustrates it better than any words. It will be noticed that the extent of the dark scaling corresponds to *calabrica*, but what makes it quite distinct and peculiar is the variation of the red scaling to pink and to yellow in more than half the individuals. In some localities the two preceding races do produce the yellow form constantly and not merely as a very rare aberration, but in no other has it been found to predominate. Most specimens thus belong to the yellow *calabrica*, called *zickerti* by Hoffman, but I think that to use the name of a single very special form for such a variable race would only lead to confusion, and both Querci and I have agreed to give it a geographical name. It is worthy of notice that in peninsular Italy also *Callimorpha dominula*, L., produces a race characterised by yellow scaling, instead of red, and by the variability and occasionally very great extent of the black pattern.

Race *hispana*, mihi.—In the Rühl collection, preserved in Florence

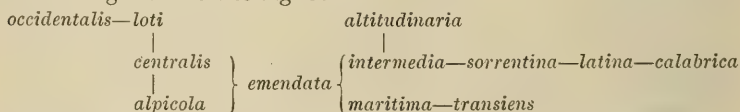
in the R. Stazione d'Entomologia Agraria, there exists a very interesting specimen labelled: "Valenzia," which I must take this occasion to mention. It is quite similar to nymotypical *sorrentina*, as described above, but each one of the six spots of the forewing is surrounded by a white ring; this character is extremely rare and never so marked in Italy. Does *transalpina*, then, occur in Spain and does it produce quite a distinct race?

The races of group *b* hereunto described are the two following:

Race *maritima*, Obth.—Similar to *emendata*, but with brighter colouring and with the dark scaling tending to expand; red spots smaller; the sixth often absent; hindwing with a broad dark margin; sometimes very broad and never as narrow as in *emendata*; red patch of underside forewings always narrow and occasionally entirely absent. This is the race of the south of France, which extends in Italy, along the Riviera, as far as is known, up to Genoa.

Race *transiens*, Rocci.—So called because in extreme specimens the dark scaling is as extensive as in *sorrentina*, invading the whole dorsal margin and anterior portion of the hindwing, and thus believed to be a transition from *maritima* to *sorrentina*. This view however is not correct, for the structure of *transiens* is even more robust than that of *maritima*, whereas a real transition to *sorrentina* should come nearer the frailer build of the latter. The right way of putting it is that *transiens* stands to *maritima* as *sorrentina* stands to *altitudinaria* or *intermedia*, being the most melanotic race of the robust maritime group. Rocci says at Genoa it flies quite near the sea, lower than *maritima*. The race, found by Querci at Formia, in the province of Caserta, at low altitudes and considered as *maritima* by Oberthür and Turati, has turned out to be identical with *transiens* on comparison with a series from Genoa sent to me by Rocci.

I think the following diagram will help to clear the connections between the different races, if it be borne in mind that the robustness of their structure increases from above downwards and the extent of dark scaling from left to right:—



Comparison of four races of subspecies *transalpina*, Esp. :—

Locality	Florence.	Bolognola.	Formia.	Villalatina.
Name	intermedia, Rocci.	altitudinaria, Trti.	transiens, Rocci.	latina, Vrtý.
Body	Thick.	Thin.	Very thick.	Thick.
Antennæ	Thick.	Thin.	Very thick.	Thick.
Density of scaling	Thick.	Thin.	Very thick.	Thick.
Light coloured scaling.	Bright red.	Pale red.	Bright red.	Bright red or yellow, occasionally pinkish.
Dark scaling	Indigo.	Greenish-indigo.	Dark indigo.	Dark blackish indigo.
Spots of upper-side of forewings.	Constantly six well developed spots.	Constantly six well developed spots.	Five or six spots, the sixth being anyhow much reduced in the majority of individuals.	Five for six spots, the sixth being anyhow much reduced in the majority of individuals.

Dark marginal scaling of hindwings.	About 1 mm. in width.	About 1 mm. in width.	Variable: 1 to 3 mm., but often extends to dorsal margin and fore-part of wing.	Usually extensive, and often so much so as to cover the whole wing.
Spots of under-side of forewings.	Always six, often more or less confluent.	Always six, often more or less confluent.	Five or six, confluent or isolated.	Five or six, always distinctly isolated.
Wing expanse	usual ..	♂ 31 mm. ♀ 31 mm.	♂ 27 mm. ♀ 28 mm.	♂ 31 mm. ♀ 31 mm.
	maximum	♂ 36 mm. ♀ 33 mm.	♂ 29 mm. ♀ 33 mm.	♂ 36 mm. ♀ 36 mm.
	minimum	♂ 27 mm. ♀ 29 mm.	♂ 26 mm. ♀ 26 mm.	♂ 26 mm. ♀ 29 mm.
	Breadth of wings	Narrow.	Very narrow.	Broad.

Sydney Webb Collection.—2nd Day's Sale. December 9th, 1919.

(Concluded from p. 11.)

This sale comprised the remainder of the Fritillaries and all the remaining species, finishing with the Skippers.

The first insect of note was a dark brown var. of *Melitaea athalia* with markings almost obsolete which realised £12 12s. Another var. *eos* figured in Newman, p. 46, fig. 3, and a similar var. with many bands of distinct spots on the underside fig. in Newman brought £6 10s. A third specimen somewhat similar also recorded £6 10s. A *Melitaea aurinia* with broad buff bands fetched £2, and two similar £4 the pair; a very dark specimen cost £5 10s. and one nearly all black £7; other good forms realised £1 1s. to £2 in lots of 2 to 20, various localities being represented. A very fine underside of *Melitaea cinxia* realised £5, and various underside forms from 8s. to 60s. in lots.

Fourteen *Chrysophanus dispar* were next produced, but were not nearly so fine as the series sold in the first sale and were priced at £2 5s. to £8 according to condition. Lot 45 a fine female *C. dispar* with coppery hindwings, a really good variety, was remarkably cheap at £10, and in my opinion was one of the best insects in the sale. Aberrations of this species are not often met with even in Covent Garden. *Rumicia phlaeas* was represented by a splendid lot of varieties, the best realising £12 12s., being a specimen with the black replaced by golden brown and figured in Barrett, p. 9, fig. 2e. Another one figured in Barrett, p. 9, fig. 2c, with large confluent spots, realised the exceptionally good price of £12. A specimen with forewings without spots except discoidals, figured in Barrett, p. 9, fig. 2d, went for £7 10s. The silvery white (ab. *alba*) and pale golden coloured (ab. *schmidtii*) aberrations were not in the best of condition, but fourteen specimens aggregated £13 11s. Three fine and perfect pale golden vars. were well worth £3 5s. Two rayed and four with hindwings all black were cheap at £2; a lot of 11, including five others, realised £5, and a similar lot £2 5s. The remaining noticeable specimen with spots on forewings absent realised £3 5s. The *Chattendenia (Thecla) w-album* underside with broad white fascia figured in Newman, p. 108, cost the purchaser £5, but although in poor condition it is a unique variety and of much interest. Two *Bithys quercus* females with the blue shading almost absent, and one with orange spots were undeniably cheap at 12s. the two lots. *Callophrys rubi* and *Celastrina argiolus* were not

very conspicuous examples and went for a few shillings only, the only exception being a *C. argiolus* with whitish forewings which brought £2 15s.

Twenty-five *Polyommatus semiargus* realised £17 6s., the best two pairs fetching 60s. and 80s. each. A long series of *Agriades coridon* now appeared, and many fine varieties were included. A pair of pale males fetched 60s. and a very dark or brown male £10. Three true gynandromorphs were sold each for £7, £7, £5 10s., but the last was in very poor condition, and none in the fine condition of the gynandromorph of *Agriades thetis* (*bellargus*) sold later for £12 10s. A dark leaden blue male realised £4, and a fine female var. *fowleri* £6. Numerous other forms of this species were sold at prices varying from 20s. to 63s. It was curious to note that no fine examples of var. *fowleri* except the one female (were included in the series), and there was only one gynandromorph of the type now so commonly taken in Herts. Recent years have seen great developments in obtaining aberrations of this species. Five of the once great rarity v. *syngrapha* only realised 20s., although they were quite historical specimens. A specimen of the Continental species *dorylas* labelled Folkstone, 1863, was not very keenly sought after and only realised 25s. with another lot included. *Agriades thetis* now claimed attention, and several beautifully coloured silvery-grey males could not be sold owing to their very poor condition and were included with a male having the outer half of wings dusky; with the aid of this specimen £6 was realised for the lot. A white underside, with broad black streaks on forewings, from the Bond collection, being in beautiful condition was keenly competed for and cost the buyer £11. A lilac-blue female figured by Barrett, pl. 13, reached £3, and a similar one and one dusky blue £2 15s. A leaden male figured in Barrett, pl. 13, only fetched £2. A very rich blue female with dark marginal spots was bidden up to £8, and a female with blue hindwings and seven others were cheap at 24s. An underside with broad streaks on forewings figured in Barrett, pl. 13, fetched £4, but was not in the best of condition. A very fine gynandromorph, one side being heavily shot with male coloration realised £12 10s. A pale brown shot blue *Polyommatus icarus* and three silvery-blue males realised £3 5s., and two good undersides (defective) £6. The underside figured in Newman, p. 83, was cheap at £3. Seven lots each of three gynandromorphs fetched 26s., 85s., 30s., 60s., 60s., 90s., 65s. each, but all the lots contained one or more insects in poor condition. A good underside, all the spots forming a broad band of dashes, realised £4 10s., but was defective. *Plebeius aegon* was represented by a series of colour variations from lilac-blue to purple and many undersides, and were sold very cheaply. Five gynandromorphs realised £9 10s., and there were a score of other gynandromorphous specimens. The remaining species consisting of *Aricia medon*, *Cupido minimus*, and the Skippers did not exhibit marked variation, but two *Urbicula* (*Agriades*) *comma*, cream coloured, and an underside figured in Barrett, p. 39, realised £8 10s. the two. Nine *Hesperia malvae* var. *taras* and five intermediates fetched only 9s.

This completed the day's sale and yielded a total of about £480, which added to the sum of the first day £920 made a total of £1,400, surely a record for Rhopalocera alone. As at the last sale the majority of the extreme aberrations were acquired for the Bright

collection, Messrs. Newman and Janson again buying freely. Taken as a whole the condition of the smaller insects was not so good as those in the first sale, in fact quite a number were more or less defective. The cataloguing of the collection by Mr. Janson was well and painstakingly done and favourably affected the financial result of the sale.

Thus has been dispersed a fine collection accumulated by one of the old time collectors over which a vast amount of time and patience must have been expended, adding much to our knowledgs of the particular species and their distribution: every insect appeared to be labelled. The *Lyceinidae* were mostly obtained from Dover and Folkestone, and a collector named Bailey seems to have possessed a keen eye for aberrational forms. The writer has seen only two private collections that excel the one sold, *viz.*, those belonging to Mr. P. M. Bright and Mr. A. B. Farn.—S. G. C.-R.

Revisonal Notes (Lepidoptera).

By Jno. HARTLEY DURRANT, F.E.S.

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1.

Phalaena Tortrix fasciana, L.

In 1864, Werneburg (Btr. Schm. 1. 224-5, 263-4, no. 82) wrote a critical note on *Tortrix fasciana*, L., and arriving at the conclusion that the insect described by Linné was the well-known *Erastria* which had also been described as *fuscula*, Schiff., Tr., and *pygarga*, Hfn., he sank these later names as synonyms, writing: "Ich glaube nicht zu fehlen. wenn ich *fasciana*, L. für *fuscula*, Tr. erkläre." Staudinger and Wocke, who in the first edition of their *Catalog* (1861) called the species *Erastria pygarga*, Hfn. (= *fuscula*, Schiff.), adopted Werneburg's views in their second edition (1871) and "*fasciana*" came definitely into use for this *Erastria*. In Staudinger and Rebel's *Catalog* (1901), for some reason unknown, *pygarga* is omitted from the synonymy of "*fasciana*, L.," and Hampson, who also adopts "*fasciana*, L.," refers it to *Lithacodia*, Hb., likewise omitting *pygarga* from the synonymy.

Linné's description is as follows;—

Phalaena Tortrix fasciana, L. Fn. Suec. (ed. 2) 342 sp. 1304 (1761).

"Ph. *Tortrix fasciana* alis fusco cinerascens: fascia alba.

Habitat in Pomariis.

Descr. Media. *Alae superiores* obscure cinerascens margine exteriore albo nigroque maculato; fascia lata, albida recurvata. *Inferiores alae* nigricantes: margine ciliari albido."

If the above description be compared with specimens of *Erastria fuscula* (2264) and 2237 *Pammene juliana*, Crt., it will be at once observed that the "fascia lata, albida recurvata" is present in *juliana*, while no such marking is to be found in *fuscula*, which is white only around the tornus. Also FW. costa "albo nigroque maculato" and HW. "nigricantes: margine ciliari albido" refer obviously to *juliana* and not to *fuscula*. Should any doubt remain, this will at once vanish after an examination of Linné's type at Burlington House, which is undoubtedly *juliana*. We must therefore adopt the following corrected synonymy:—

2237 *Pammene fasciana*, L.n.syn.=*juliana*, Crt.

Phalaena Tortrix fasciana, L. Fn. Suec. (ed. 2) 342 sp. 1304 (1761).
 = *Philalcea juliana*, Crt. Br. Ent. 13 583 (1836). †*Pamene juliana*,
 Stgr.-Rbl. Cat. Lp. Pal. 2 124 sp. 2237 (1901).

We are now left with the *Erastria*, which requires a name. There can be no reasonable doubt that this is the insect described by Hufnagel and by Rottemburg as *Phalaena pygarga*, and as this name is older than *Noctua fuscula*, SD., the synonymy will be:—

2464 *Lithacodia pygarga*, Hfn.

Phalaena pygarga, Hfn. Berl. Mag. 3 408 sp. 85 (1766); Rtmbg. Naturf. 9 136-7 sp. 85 (1776).

Erastria pygarga, Stgr.-Wk. Cat. Lep. Eur. 59 sp. 847 (1861).

= *Noctua fuscula*, S.-D. Schm. Wien. 89 sp. 6 (1775); Bkh. Eur. Schm. 4 192-3 sp. 87 (1792).

= **fasciana* (nec L.), Wrnbg. (= *pygarga*, Hfn.; = *fuscula*, Tr.), Wrnbg. Btr. Schm. 1 224-5 263-4 no. 82 (1864).

= *Erastria *fasciana* (nec L.), Stgr.-Wk. Cat. Lep. Eur. 134 sp. 1901 (1871); Stgr.-Rbl. Cat. Lp. Pal. 1 231 sp. 2464 (1901).

*Lithacodia *fasciana* (nec L.), Hmsn. Cat. Lp. Phal. B.M. 10 516, 539-40 sp. 5807 (1910).

Sir George Hampson refers *pygarga* (= **fasciana* [nec L.] Hmsn.) to *Lithacodia*, Hb. 1818, employing *Erastria*, Ochs. (1816) for *trabealis*, Sep., while *Erastria* is used by Stg.-Rbl. for *pygarga* and its allies. There is, however, an earlier *Erastria*, Hb. Tent. (1805), *Geometr.*, which will in any case justify the adoption of *Lithacodia* for the species under discussion.

NOTES ON COLLECTING, Etc.

REFERENCES FOR LOCALITIES.—GAVARNIE.—*Ent. Rec.*, xx., 50, 179; xxii., 109; xxiv., 150, 157; xxvi., 237.

GUÉTHÉRY.—*Ent. Rec.*, xxv., 33.

PYRENEES.—*Ent. Rec.*, xxii., 57, 108; *Ent. Mo. Mag.*, xx., 205; xxx., 220; *Ent.*, xxxviii., 243, 273; xlv., 334; xlv., 57.

VERNET-LES-BAINS.—*Ent. Rec.*, xx., 176; xxii., 58; xxv., 28, 227; xxvi., 8; *Ent.*, xxxviii., 277, 299.

AMELIE-LES-BAINS.—*Ent.*, xlii., 120.

DORKING, SURREY.—*Ent.*, xxxiv., 110, 205, 228, 258; xxxv., 118, 323; xxxvi., 27, 195; xxxviii., 63; xxxix., 157, 183.

BOX HILL.—*Ent. Rec.*, xv., 307; *Ent. Mo. Mag.*, i., 119; *Proc. S. Lond. Ent. Socy.* (1907), 67; *Ent.*, xii., 297; xvi., 268; xvii., 201; xix., 101, 293.

RANMORE COMMON.—*Proc. S. Lond. Ent. Socy.* (1902), 46; (1906), 29; (1914), 90.

LEITH HILL.—*Proc. S. Lond. Ent. Socy.* (1906), 21.

PERFECT GYNANDROMORPHS.—I should be very glad to have particulars of any examples of perfect gynandromorphs of British Rhopalocera, i.e., specimens in which the wings on one side are

typically male and on the other side typically female, existing in our collections at the present time. In the *Ent. Rec.*, Vol. 27 is a much more comprehensive list, but in this are included mainly Continental examples. I am anxious to compile as complete a list as possible of British specimens. Any information will be very gratefully received. So far I have particulars of some examples in the following species—*Pieris rapae*, *Euchloë cardamines*, *Colias hyale*, *C. edusa*, *Gonepteryx rhamni*, *Bithys quercus*, *Agriades thetis* (*bellargus*), *A. coridon*, *Plebeius aegon*, *Celastrina argiolus*, *Polyommatus icarus*, *Dryas paphia*, and *Polygonia c-album*.—H. G. CASTLE-RUSSELL (F.E.S.), MONKSWOOD, WOKING.

A FEW ENTOMOLOGICAL NOTES FROM PUTNEY FOR 1919.—In 1917 [*Ent. Rec.* 29 235 (1917)] I recorded some dates of insects noticed at Putney, chiefly in my garden (and elsewhere). By a printer's error these were signed "Ibid," instead of with my name; thus making it appear that they were written by Mr. Sich! I have since 1917 always jotted down in my pocket book dates when insects were first noticed at Putney. Unfortunately I lost my last year's book, so was unable to publish the dates for 1918. Putney at one time was a very good locality (the late E. C. Rye recorded many rare beetles for it as he lived here for many years), and probably is so still if properly worked. Before giving my 1919 dates, I may mention that a fence near my house is riddled with the borings of *Hylotrupes bajulus*. I have watched it for the last three years, but have not seen the perfect insect. Putney is one of the old records for this fine Longicorn. As may be seen elsewhere [*Ent. Rec.* 31 (1919)] I have taken a nice series of it through the kindness of my friend, Mr. R. S. Mitford, near Weybridge.

February 21st.—The honey bee (*Apis mellifica*) out in road.

March 24th.—The Churchyard Beetle (*Blaps mucronata*) on footpath. I have several times found this beetle in roads in Putney.

April 6th.—The first Queen Wasp (*Vespa vulgaris*) seen out. In 1918 I saw the first on the wing in January. ♂♂ appeared end of October and beginning of November.

April 7th.—The Brimstone Butterfly (*Gonepteryx rhamni*) in my garden.

In May (I forgot to put the date) the Solomon's Seal Sawfly (*Phymatocera aterrima*) was flying about over the *Polygonatum*, and subsequently the larvæ occurred in profusion on the plants. This was also the case in 1918.

May 8th.—The small White (*Pieris rapae*) was seen on the wing in the High Street.

May 12th.—The Holly Blue *Celastrina* (*Cyaniris*) *argiolus* in my garden.

May 29th.—The Lace Wing Fly (*Chrysopa* sp. ?) in my garden.

June 28th.—My neighbour brought me a specimen of the Currant Clearwing, *Sesia tipuliformis*; a few days later I saw another specimen in my own garden.

July 18th.—I saw and chased a black and white Butterfly in the Hazlewell Road. I believe it to have been a foreign species introduced in some way, or bred by someone and allowed to escape. It appeared to be striped black and white, to have long narrow wings, and it flew very fast and straight.

July 23rd.—The Stag-Beetle (*Lucanus cervus*) in my garden. I frequently saw specimens (mostly females) in Hazlewell Road and the roads near by during July.

August 24th.—I captured a fine specimen of the House Cricket (*Gryllus domesticus*) in a coal bin. This bin is not warm, as it is out in the yard, not near the kitchen. It is the first time I have seen a Cricket alive for over forty years. It used to occur behind the wainscoting in the large old-fashioned kitchen in my father's house at Earls Shilton in Leicestershire.

September 7th.—*Longitarsus flavicornis* was in abundance on *Convolvulus* in a road near here: the plants, which were growing beside a fence near some waste ground, being riddled with holes. The ab. *fumigatus* occurred sparingly. Fowler gives the foodplant as *Eupatorium*; but in the supplement we give *Convolvulus*, which is the proper foodplant of the beetle.

September 18th.—The Red Admiral (*Pyrameis atalanta*) was flying in the High Street.

September 26th.—I noticed the little moth (*Tortrix pronuba*) in numbers hovering about a fence in Upper Park Fields. The time was 10.30 a.m., and the moths were evidently "sembling," as about 50 were fluttering over and settling on one board in the fence; running up and down and flying off the board again. When I returned in half an hour's time only a few specimens were to be seen, but always on the one board. Mr. Durrant tells me that this moth has only been in Britain for a few years, having been introduced from the Mediterranean coast lands.

September 27th.—The Small Tortoiseshell (*Vanessa urticae*) flying in my garden.

October 1st.—Captured some specimens of *Eupteryx melissae* on a clump of garden sage in my front garden. This little frog-hopper, which is coloured exactly to match the leaves of the sage, has occurred all the summer in some numbers. Even to-day, December 12th, a few are present, in spite of the rain, snow, and frost we have had lately. Specimens taken on November 2nd and put in a bottle with a few sage leaves, laid eggs, or at any rate produced young, as very tiny larvæ were found in a day or so. I do not know if anything of the life history of the species is known, or not.

November 19th.—*Aleurodes loniceræ*, Walker. A neighbour told me that a small white insect was destroying some honeysuckle in a cold conservatory and asked me to come and see it. I secured specimens and ran it down as a species of *Aleurodes*, in the *Cambridge Natural History*. The insects are breeding still (December) in spite of the very cold weather. The nymph does not show the segments and limbs of the insect as is figured in the work referred to above. Very little is known about these little creatures, and I had thought of breeding them and working out the life-history. I found, however, that Mr. Laing of the British Museum wanted to do this, so I have turned them over to him.—HORACE DONISTHORPE.

ZYGÆNA TRIFOLII AGAIN (*ante* vol. xxiii., p. 28).—Last summer I spent a few weeks in the Malvern district and in my wanderings I came across an interesting colony of *Z. trifolii*; the colony was interesting from its environment and its very close proximity to a large *silipendulæ* area rather than from a varietal point of view.

On June 30th I was passing through a meadow path in a fairly wide valley, when I came across a locality with an abundance of *Zygaena filipendulae*. It was a nice ordinary dry meadow pasture of considerable extent, and *filipendulae* was abundant, many in good condition, many decidedly "passé." After watching them for a time I passed on up a steepish hill; when just at the edge of the wooded summit in a pocket of slightly damp ground with rushes and the like, I found a *trifolii*, then another and another, it at once became apparent that I had struck a small colony of this (to me) interesting species, the slight depression was of very limited extent and not three hundred yards from the *filipendulae* meadow.

I kept the colony under close and continuous inspection for nearly three weeks, and during the emergence period I never saw one outside their special area, though as they increased in numbers and age they wandered further afield, but I did not see one "five-spot" actually down in the meadow already referred to.

On June 30th the species was absolutely fresh. I watched them drying their wings on that and the few following days by the dozen, but I did not discover one emergence on the dry ground fifty or a hundred yards below their own little damp depression. After the first ten days the emergences became very considerably reduced; I might see one or possibly two in a day, whereas during the first four or five days I have no doubt I witnessed a dozen to two dozen each day, for the species was abundant.

What especially interested me was the almost complete separation of the two species. I was particularly on the watch for the mating of the two, but I did not see a single instance, and it was most rare to see *filipendulae* among the *trifolii* colony; I counted about half a dozen such cases. At the bottom of the hill was a ditch or a hedge which we might perhaps consider the boundary line, for I only found two *trifolii* on the other side of that hedge, i.e., in the *filipendulae* area, and those two had evidently been on the wing a long time. There was, however, an intermediate district much nearer the colony, a rich bit of pasture on the side of the hill, where both species met, but even here the "six-spot" was very much commoner than the "five-spot." This would, however, be more or less what one would expect, for as the meadow land became dryer *filipendulae* would naturally be attracted by the flowers further up the hill, whereas *trifolii* did not need to be attracted downwards, having all they needed in their own locality.

In this district also, as in others in my experience, *filipendulae* was probably on the wane when *trifolii* began its emergence; the race here is a fine one, the specimens being fine, fairly large ones, uniform in type, with good large spots and very little variation—very different indeed from what I have found in several of the Devon localities. I must have examined hundreds and hundreds of specimens in the Malvern colony, and I only found ten with the least inclination to the extension of spots and this but very slight, but two of them have the upper median spot almost connected with the fifth spot by a narrow red line on the right wing only, whilst I took one only with these two spots confluent though separate from the lower median spot.

The race found here is I think the most uniform and stable I have ever met; out of a very large series there is not one of the type race,

all are of the *orobi* race, *i.e.*, with the median spots separated, I must have examined several hundred and I did not meet with one true *trifolii*, Esp., with the median spots confluent, neither did I meet with one var. *minoides*, Selys., the nearest being the one specimen that has the fifth spot confluent with the upper median only. The almost strict uniformity I might almost say rigidity to the var. *orobi*, Hb., is extraordinary, as my experience in England has led me to expect a considerable amount of variation whenever a really flourishing colony, such as this was, has been found. The Malvern race is not quite so large as the Devon one, but the bronze colour is brighter and clearer though this may possibly be owing to the fact that I discovered them at the very beginning of their emergence, but the almost rigid constancy of the form is perhaps the most interesting character of the colony.—G. T. BETHUNE-BAKER, *January, 1920.*

THE OCCURRENCE OF *STRYMON PRUNI*, L., IN SURREY.—The larvæ of this species were beaten out from sloe in May, 1919, by Mr. A. A. Tullett, F.E.S., of the staff of this Museum. Six specimens were hatched and are in the "Joicey" collection. We believe this to be the first record of *S. pruni* as occurring in Surrey. For obvious reasons the locality cannot be given, but is within 12 miles of Haslemere.—GEORGE TALBOT, The Hill Museum, Witley, Surrey. *January 26th.*

CURRENT NOTES AND SHORT NOTICES.

Parts III. and IV. of the *Trans. Ent. Soc. Lond.* have just been issued and contains (1) "Notes on Exotic Proctotrupodea," by Alan P. Dodd; (2) "The Scent Scales of *Pinacopteryx liliana*," by F. A. Dixey, M.A., F.R.S., with one plate; (3) "A new *Hydroptila*, *H. simulus*," by M. E. Moseley, F.E.S., with one plate; (4) "Scent-organs in the *Hydroptila* (Trich.)," by M. E. Moseley, F.E.S., with two plates; (5) "The male abdominal segments and ædeagus of *Habrocerus capillaricornis* (Col.)," by F. Muir, with a plate; (6) "On the Mechanism of the Male Genital Tube in Coleoptera," by F. Muir, with one plate; (7) "A new family of Lepidoptera, the *Anthelidae*," by A. J. Turner, M.D., F.E.S.; (8) "The Histology of the Scent-organs in the Genus *Hydroptila*," by H. Eltringham, M.A., D.Sc., with one plate; (9) "New Moths collected by A. Avinoff in W. Turkistan and Kashmir," by Sir Geo. Hampson and J. H. Durrant, F.E.S.; (10) "Cocoon softening in some Agrotids (Noctuae)," by Dr. T. A. Chapman, F.R.S.; (11) "Notes on *Lycaena alcon*," by Dr. T. A. Chapman, F.R.S., with six plates, one coloured; (12) "Contributions to the Life-history of *Lycaena euphemus*," by Dr. T. A. Chapman, F.R.S., with eight plates, one coloured; and 48 pages of Proceedings at the ordinary meetings. This last contains some very important items, among which may be mentioned (1) The announcement of a saw-fly new to Britain, *Lygaenematus wesmaeli*, by the Rev. F. D. Morice; (2) "The Association of *Formica rufa* (Hym.) with *Coccinella distincta*," by H. Donisthorpe, F.Z.S.; (3) Many observations communicated by Prof. Poulton, on Neotropical Insects; (4) Mendelian Heredity in *Papilio dardanus*, by C. F. Swynnerton; (5)

Androconia in a Bee, by the Rev. F. D. Morice; (6) The differentiation of British *Dianthoeccia barrettii* from the Continental *D. luteago*, by H. Edelstein, with a plate; (7) A Hemipteron, *Megacoelum beckeri*, was announced as new to Britain by H. Donisthorpe, F.Z.S.; (8) A Tineid, *Ancylis tineana*, was announced as new to Britain by J. H. Durrant; (9) A discussion of the races of *Plebeius aegon*, especially of var. *masseyi*, by J. J. Lister.

The New York Agricultural Experiment Station regularly issues *Bulletins* of the work it is carrying on. The last two to hand are:— 1. "The Rosy-Aphis in relation to abnormal apple structures," with two coloured and six other plates; and 2. "Experiments for the control of the grape root-worm, the larva of a beetle *Fidia viticida*," with ten plates and numerous figures.

In the *Rev. Mens.* for December, M. Chas. Cabeau describes a new aberration of *Melitaea aurinia* as ab. *semifusca* in which the forewings are suffused with brownish to such an extent that all the yellowish markings have disappeared and most of the markings are practically indistinguishable; at the same time he describes a new aberration of *M. cinxia* as ab. *leucophana*; the upperside of the wings had the typical black markings, but the ground of the forewings is of a slightly yellowish white, that of the hindwings of a whitish yellow; the underside of the former is very pale; the three bands of markings of the latter are white; and the two other bands scarcely show yellow.

In the *Irish Nat.* for November-December the Rev. W. F. Johnson gives a series of Entomological Notes for 1919 mainly from Poyntypass and Portnoo. He records a *Pyrameis atalanta*, *Cupido minimus* at Portnoo, a scarcity of *Melitaea aurinia* where it was abundant last year, *Callophrys rubi* among heather, etc. His further records are of Coleoptera, several species of which order had invaded a beehive, the occupants of which had succumbed during the previous winter; Diptera, recording interesting captures by the Empid Fly *Rhamphomyia cinerascens*; and Hymenoptera, which had evidently been affected by the long spell of cold and wet weather.

In the *Scottish Nat.* for November-December are several records of the occurrence of *Colias edusa* in the Edinburgh and Forfar areas, including the capture of var. *helice* in June. June, August, and September are the months of the records. In the same number is a record of a large number of the larvæ of *Caradrina cubicularis* being taken in bundles of flax.

On January 20th was held once more the "Verrall" Supper, when about a hundred entomologists from all over the country assembled to recall the memory of the genial host of years gone by, at the invitation of the "Association of Entomologists." The meeting took place at the Imperial Restaurant, Regent Street, where the arrangements were carried out quite satisfactorily. Among those present we noted Messrs. Adkin, B. W., Adkin, R., Andrews, H. W., Ashby, E. B., Ashby, S. R., Arrow, G., Bagwell-Purefoy, Capt., Bethell, E. G., Bethune-Baker, G. T., Blair, K. G., Box, L. A., Carr, F. B., Cameron, M., Cant, A., Carr, Prof. J. W., Champion, G. C., Collin, J. E., Colthrup, C. W., Copeman, Col. S. M., Dixey, Dr., Dods, A. W., Edelsten, H. M., Edwards, F. W., Edwards, Stanley, Ellis, B. Willoughby, Eltringham, Dr. H., Elwes, H. J., Fagan, C. E., Frisby, G. E., Frohawk, F. W.,

Gahan, C. J., Gibb, Lachlan, Green, E. E., Grosvenor, T. H. L., Hamm, A. H., Harwood, B. S., Hodge, H., Hunter, Dr. D., Image, Prof., Imms, Dr. A. D., Janson, O. E., Jones, A. H., Joy, Dr. Norman, Joy, E. C., Kirkpatrick, T. W., Leman, E. Curtis, Leman, G. Curtis, Lister, J. J., Lloyd, R. W., Lofthouse, T. A., Lucas, W. J., Lyle, G. F., Main, H., Mera, A. W., Morey, F., Morice, Rev. F. D., Marshall, G. A. K., Neave, Dr. S. A., Newman, L. W., Nicholson, C., Nicholson, W. E., Nurse, Col. C. G., Pierce, F. N., Porritt, G. T., Poulton, Prof. E. B., Riley, N. D., Rothschild, Lord, Rowland-Brown, H., Sieh, A., Scott, H., Shaw, V. E., Sheldon, W. G., South, R., Step, E., Stiff, Rev. A. T., Tomlin, J. Le B., Tonge, A. E., Turner, H. J., Wainwright, C. J., Walker, Comm. J. J., Wheeler, Rev. G., Wyse, L. H. B., Yerbury, Col. J. W.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

November 27th, 1919.—ANNUAL EXHIBITION.—Mr. S. G. Castle-Russell exhibited aberrations of the following British Lepidoptera:—*Dryas paphia*, rayed and suffused, varied *valezina* forms, intermediate, bleached, blue shade below, etc.; *Limenitis sibilla* ab. *nigrina* underside; yellow tipped *Euchloë cardamines*; *Brenthis euphrosyne* rayed, cream coloured, etc.; *Coenonympha pamphilus*, a very pale series; *Aphantopus hyperantus*, a long series of bred ab. *lanceolata*; *C. tiphon*, long series of aberrations, pale, ab. *lanceolata*; *Celastrina argiolus*, a perfect gynandromorph, and colour forms; *Agriades coridon*, a perfect gynandromorph, ab. *syngrapha*, ab. *striata*, ab. *obsoleta*, etc.; *Plebeius aegon*, 80 aberrations, ab. *striata*, ab. *obsoleta*, etc., and 40 females with one wing, the smaller, shot with male blue coloration; all taken or bred in the last two or three seasons.

Mr. T. H. Grosvenor, a pair of *Attacus atlas* form *edwardsi* from the Khasia Hills and a large number of Scorpions taken in the Punjab, N.W. Provinces, etc.

Mr. B. S. Williams, a series of *Lomaspilis marginata* from Finchley showing an extreme range of variations.

Mr. E. E. Green, (1) *Papilio bianor* taken at Camberley; (2) a series of *Parascotia fuliginaria*, taken at light at Camberley; (3) two *Agrotis saucia* ab. *margaritosa* taken at sugar; (4) aberrations of *Luperina testacea* and *Himera pennaria*; (5) *Stephanitis rhododendri* an introduced pest of rhododendrons; (6) the rare Hemipteron *Corizus maculatus* from birch; and (7) a contrivance of an iron ring and muslin for covering cylinders, jars, etc., for breeding.

Mr. A. E. Tonge, an *Amorpha populi* entirely devoid of marking; and the very rare Noctuid *Cloantha polyodon* (*perspicillaris*) from Worthing.

Mr. Leonard Tatchell, two very dark *Arctia caja*, one having scarcely any traces of cream on the forewings.

Mr. R. Adkin, series of the British species of *Nolidae* and *Nycteolidae*, illustrating their range of variation.

Mr. L. A. Box, examples of the more common species of the parasitic Chalcids.

Mr. C. W. Sperring, a selection of aberrations of *Mimas tiliae*, *Brenthis euphrosyne*, *Agriades coridon*, and *Plebeius aegon*.

Mr. Percy Bright, very long series of aberrations of *Brenthis euphrosyne*, *B. selene*, *Chrysophanus dispar*, and *Rumicia phlaeas* with the rare ab. *alba*.

Mr. K. G. Blair, the black form ab. *nigra* of *Cetonia aurata* from St. Mary's Scilly, 1919.

Mr. Johnston, a series of aberrations of *D. paphia* and *L. sibilla* from the New Forest, July, 1919.

Mr. H. A. Leeds, a large number of aberrations of *P. icarus*, *A. medon*, and *A. coridon*, named by Tutt's Brit. Lepid., no less than 18 being of the last species, and of *A. hyperantus*, *H. malvae*, *E. jurtina*, *S. pruni*, etc.

Mr. R. South, aberrations of *B. selene*, confluent and suffused; *C. pamphilus*, pale splashed and dark; silvery-grey *Tortrix crataegana* and dark suffused *T. xylosteana*.

Mr. Curwen, a very fine selection of *Zygaenidae* from Italy, including many striking races and aberrations of *Z. transalpina* from Central Italy; races of *Z. stoichadis*, *Z. achilleae*, *Z. oxytropis*, and *Z. carniolica*, and *Z. punctum*, *Z. erythrus*, etc.

Mr. Clifford Craufurd, aberrations of *D. paphia* and *L. sibilla*.

Prof. Bateson, drawings of flowers produced by plants propagated as root cuttings, to compare with flowers produced by normal plants grown from seeds.

Mr. H. Moore, various forms of *Danais chrysippus* and *Hypolimnas misippus*, and read notes on the association of the two species.

Mr. A. W. Mera, bred series of *Tephrosia crepuscularia* and *T. biundularia* with melanic and hybrid races.

Mr. A. A. W. Buckstone, aberrations of *Colias edusa*, dark and pale ground; *Callophrys rubi*, pale blotched; *Pieris brassicae*, green lined; *Triphaena fimbria*; *T. comes*; ab. *nigrofulvata* of *Semiothisa liturata*, etc.

Mr. C. W. Colthrup, aberrations of many British butterflies taken in 1918-19, including *C. edusa*, *B. euphrosyne*, *E. tithonus*, extra spots, *H. semele*, *A. urticae*, *R. phlaeas*, *E. jurtina*, *A. coridon*, etc.

Mr. Newman, bred ab. *walkeri* of *Spilosoma menthastri*; yellow and salmon coloured *Zygaena filipendulae*; *Z. achilleae* from N. Britain, etc.

Mr. C. H. Williams, aberrations of *Agriades coridon*; and a series of named forms of *A. grossulariata*, including ab. *radiata*, ab. *iochalcea*, ab. *lacticolor*, ab. *fulvopicata*, ab. *nigrisparsata*, ab. *semilutea*, etc.

Mr. H. O. Wells, two perfect gynandromorphs of *Plebeius aegon* from Berkshire.

Mr. Edwards, exotic Papilios.

Mr. Garrett, *E. jurtina* with one wing suffused black, and *Ochyria designata* with curiously irregular markings.

Mr. H. J. Turner, a collection of Lepidoptera sent to him from S. America, including the Ceratocampid, *Citheronia vogleri*, with a photograph of its hitherto unknown larva, an unnamed local form of *Propona chromus*, the rare *Protoparce bergi*, several other *Protoparce*, *Attacus maurens*, several species of *Hesperidae*, *Libythea carinenta*, etc.

Mr. F. W. Frohawk, aberrations of *Vanessa io*; *L. sibilla*, gradation to complete dark suffusion; *D. paphia*, various forms of confluence of spots upper and undersides; *A. cydippe* (*adippe*), partially albinistic, leaden coloured markings, etc.

Mr. W. J. Kaye, long varied series of *Melitaea cinxia* and *M. athalia*, great reduction of dark markings to heavy extension of markings, on both upper and undersides.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

November 17th, 1919.—PAPER ON *PERONEA CRISTANA* AND ON *S. REVAYANA*, ETC.—Mr. Wm. Mansbridge read a short paper on *Peronea cristana* and *Sarothrips revayana* in the New Forest. The paper was a description of a few days holiday at Brockenhurst in pursuit of these variable moths, and was illustrated by the insects captured. Some twenty varieties of *P. cristana* and fifteen of *S. revayana* were exhibited. Mr. Mansbridge also showed a long series of *Bryophila perla* from Wavertree, taken from about 300 yards of red sandstone wall which was only sparsely covered with light grey lichen. The moth was in unusual plenty in August, 1919, and was exceptionally variable. The exhibit comprised bright yellow, orange-mottled forms with the black markings reduced; bright green mottled with darker, the black markings normal; specimens with the usual ochreous ground colour of a greenish grey; also some with all the markings very much intensified; and finally, a few almost unicolorous, pale ochreous examples. There was no orange coloured lichen on the wall, neither has any been seen elsewhere in the district. Several members brought their series of *B. perla* for exhibition.

SOME WINTER MOTHS.—Mr. S. Gordon Smith shewed a fine brick red variety of *Himera pennaria* from Chester, an apparently wingless female of the same from Delamere, and uncommon forms of *Hibernia defoliaria* also from Delamere.

LOCAL BRITISH LEPIDOPTERA.—Mr. W. A. Tyerman exhibited bred *Melanthia albicollata* from near Prescott; *Odontoptera bidentata* ab. *nigra* and typical *Amphidasis betularia* from Simonswood; *Cidaria immanata* from Prenton, and *Eupithecia abbreviata* from Llangollen.

December 15th, 1919.—ANNUAL MEETING.—The usual reports were presented and the following were elected as Officers and Council for the ensuing year. *President*: Mr. S. P. Doudney. *Vice-Presidents*: Messrs. R. Tait, F.E.S.; R. Wilding; and Dr. C. B. Longstaff, M.A., F.E.S. *Hon. Treasurer*: Dr. John Cotton. *Hon. Librarian*: Mr. A. W. Hughes. *Hon. Secretary*: Wm. Mansbridge, F.E.S. *Council*: Messrs. W. A. Tyerman; W. Buckley; Prof. R. Newstead, M.Sc.; F.R.S.; G. F. Mathew, F.L.S.; L. West, M.I.M.E.; A. W. Boyd, M.C., M.A.; Dr. A. R. Jackson; W. J. Lucas, B.Sc., F.E.S.; S. Gordon Smith; Alfred Newstead, F.E.S.; Rev. F. M. B. Carr; and E. F. Studd, M.A., F.E.S. Mr. F. N. Pierce, of Warmington, Oundle, Northants, was elected an Honorary Member of the Society.

ANNUAL ADDRESS.—The President read an address entitled "Notes from Cartmel Fell."

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LEONARD TACHELL, Lepidopterist, 43, Spratt Hall Road, Wanstead, E. 11.

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Desiderata.—*Euchloë cardamines* from Ireland; also types of *E. cardamines* from Switzerland, Italy, S. France; var. *turritis* (S. Italy), var. *volgensis*, var. *thibetana*, and of *E. gruneri*, *F. euphenoides*, *E. damone*, and any paleartic species of the genus. *Duplicates.*—*Loweia dorilis* and vars., a few minor vars. of *R. phleas* (British), and many British lepidoptera.—Harold B. Williams, 82, Fifeley Avenue, Stoke Newington, N.

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Mr. Donisthorpe will still be glad to receive ants and Myrmecophiles from all parts of the British Isles, and to name any such for anyone who is kind enough to send them to him. He would however suggest that ants from any other parts of the world be sent to his colleague, Mr. W. C. Crawley, 29, Holland Park Road, W. 14. Mr. Crawley is specialising on the ants of the world, and it is a matter for congratulation that we should possess an Entomologist in this country whose whole attention should be concentrated on this branch of Entomology.

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Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m. 1920, March 10, 24th; April 7th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E. 3.

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EDITED BY

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The Swiss species of the Genus *Hesperia*.

By B. C. S. WARREN, F.E.S.

In recent years there have been great changes in the classification of the Palearctic *Hesperiidae*. The defining and separating of species and varieties, which has been worked out in detail, both in the structural and superficial characteristics of the various forms, has gone far to simplify the task of the collector interested in the genus *Hesperia*. These changes are, by now, probably familiar to most collectors interested in the subject, while recently Dr. Chapman has given (*Ent. Rec.*, vol. xxix. and xxx.) a review of Prof. Reverdin's *Révision du Genre Hesperia*, accompanied by some useful plates. Although the separating of the species in the genus may always be a matter of some difficulty, yet we now know that it is nothing like the impossibility it was so long considered to be; and with a certain amount of experience the European species will be found to offer no greater difficulty than do the closely allied species of *Melitaea*. One must of course except the case of *malvae* and *malvoides*, for it is not possible to separate these two species with certainty, by their superficial characteristics. It is easy enough with a series of the two side by side, to note certain differences (such as the colour of the palpi and the antennæ; the presence or absence of the white sub-marginal spots on the upperside of the forewing) which are more prevalent in one species than the other, but they are, unfortunately, not constant to either, and are also subject to individual variation. As a general rule the locality will be sufficient to determine the species, but in places where the two are known to approach, this test will also fail. Then, again, there will always be the possibility of finding both species in the same locality in some district, from which they have not yet been recorded. Therefore, the identification of specimens, taken near the northern or eastern limits of the area inhabited by *malvoides*, can never be reliable, unless the genitalia have been examined. The mutilation of specimens is of course the principal objection to this method of identification; but, when one wishes to examine the genitalia merely for the purpose of identification, it is not necessary to remove the body. This I fancy is not generally known. When dealing with fresh killed specimens it is quite possible, with the aid of a strong hand lens, to determine the species by their genitalia, without removing the body, or injuring the specimen in the least. Of course the greater the power of the lens the better, but a very high power is by no means essential, and when examining species in which the differences in the genitalia are pronounced (as they are in most of the *Hesperias*) it is not only possible, but a perfectly simple matter. The collector who identifies his captures of *malvae* and *malvoides* by this means, will only have to examine one or two specimens from each locality; as, up to the present time, the two species have never been found to overlap. I may add here, however, that my subsequent records of the distribution of these two species are not based on any such casual examination; for, while I was endeavouring to ascertain the exact extent of their habits in the Rhone Valley and elsewhere, I examined two-thirds of all the specimens taken. Of course it is quite impossible to deal with old and dry specimens in any way except by removing the body. Collectors who have no previous knowledge of the genitalia of the

Hesperiid species, but who wish to check the identification of their captures in the manner described above, will doubtless find it convenient to take the plates from Dr. Chapman's articles which illustrate the genitalia with them for reference on their continental butterfly hunts. The plates of the species themselves, however, I would recommend them to leave behind. Many of the special characteristics exhibited by the species of *Hesperia* are very small, and consequently difficult to memorise; but enlarged figures, though theoretically an advantage, are very apt to be misleading. If some small spot happens to be in question, as being slightly different in two species, and one has studied the difference on a magnified illustration; on examining the insects themselves, the feature we are looking for appears so much less pronounced than what we have been accustomed to in the illustration, and consequently so alike in both species, that a doubt is at once raised in our minds. But, if one has been accustomed to these slight differences, as shown by two natural sized figures, on seeing them in nature they are immediately recognised. I therefore advise collectors not to trust much to enlarged figures, even the perfect photographs accompanying Dr. Chapman's papers.

Of the seventeen (eighteen if *foulquieri* and *bellieri* should prove to be distinct) European species belonging to the genus *Hesperia* (sens. restr.) no fewer than twelve are to be found in Switzerland, and they can all be taken in the cantons of Vaud and Valais; while several more occur in central and southern Europe. In spite of this many collectors in recording the results of their continental trips, ignore the existence of the *Hesperias*; or, just casually mention the capture of *carthami*, *alveus*, or *malvae*, the names of the other species being but occasionally to be seen in the pages of our entomological magazines. The fact remains, I am afraid, that there are but few English collectors who have taken the trouble to make themselves familiar with the various forms of the *Hesperias*, or have any definite idea what the names *fritillum*, *armoricanus*, *onopordi*, etc., should be applied to. This is doubtless to be attributed to the two following causes: firstly, the fact that all the systematic works on the European butterflies which are at present in use, were published before Prof. Reverdin's researches cleared matters up, and secondly, the difficulty in identifying the frequently occurring minor aberrations. Generally speaking, the typical forms of each species can readily be identified by anyone who has studied the genus at all carefully; but the slightly aberrant specimens which do not vary on any constant lines (but which deviate slightly from the type, often assuming a likeness to some other species while at the same time losing some of their own distinctive features) often become puzzling, and are almost invariably responsible for mistakes in identification. The range of this transitional variation is probably not surpassed in any other genus of European butterflies, but up to the present little or nothing has been published on the subject. I hope, therefore, the following notes (which although of a most fragmentary nature are the result of careful observations made during many seasons) on the Swiss species in the various localities where I have come across them will be of interest to those who collect abroad, and will help to dispel some of the difficulties of identification arising from this transitional variation.

There is one more point which I must mention before coming to

the species themselves. In the first vol. of Seitz' *Macrolepidoptera of the World* all the palaearctic black and white "skippers" are massed in the genus *Hesperia*. The reason for this "lumping" matters little; but it is interesting to note that to treat this swarm of species in an intelligible fashion, Mabille had to divide them into sections and sub-sections, more or less corresponding to the specialised genera in which the species have been placed by modern writers. Thus we find the restricted genus *Hesperia* approximately represented by section "C," divided into two sub-sections: (a) Those species having the "white discocellular spot of the hindwing beneath straight and without a projection towards the base," and (b) those species having the "white discocellular spot on the underside of the hindwing prolonged towards the base." The species of the genus fall naturally into these two groups, and, it is safe to say, that if, in the past, writers had always so divided the genus, much of the confusion which has so long enveloped it would have been avoided. The characteristic features of these two groups have been noted by many authors, but only as applicable to individual species. I have therefore, in the following notes, placed the species in their respective groups, "A" and "B," as designated by Mabille, hoping that I may help to bring them into more general use, and so demonstrate their practical value. The majority of collectors will appreciate the fact that by identifying the group to which their specimen belongs, they are reducing by half the difficulty of naming it. Further, if it is desired to make any detailed study of the variation of the species of the genus, it is absolutely necessary to familiarize oneself with the characteristics of each of these groups, as one of the most important lines of variation is that in which the features of one group are assumed by an individual of a species belonging to the other. This division of the species, applied to the European species, gives one the following results:—

I. Those species in which the inner edge of the median band underside hindwing is rectilinear, the central spot not projecting towards the base of the wing=group A, and includes:

alveus, *ruffelensis*, *armoricanus*, *bellieri*, *carlinae*, *fritillum*, *serratulæ*, *cynarae*, and *melotis*.

II. Those species in which the inner edge of the median band underside hindwing is not rectilinear, the central spot projecting sharply towards the base of the wing=group B, and includes:

carthami, *andromedæ*, *centaureæ*, *cacaliae*, *onopordi*, *sidae*, *malvæ*, and *malvoides*.

The position of *melotis* is, perhaps, doubtful. Mabille places it in group A, and in M. Culot's excellent figures (*Bull. Soc. Lep. de Gen.*) such remnants of the median band as are visible seem to justify his doing so.

GROUP A.

H. alveus, Hb.

Alveus is one of the most interesting species of the genus, owing to the fact that it is so prolific in local races. Many of these so-called races have turned out to be distinct species, and probably in the future more of them will be found to be so too. In very few instances, how-

ever, do these local forms entirely replace the type. In Switzerland many localities produce some specialised form, which occurs with more typical examples in about equal numbers, such a form being, as a rule, difficult to describe on paper in a manner useful to anyone unacquainted with it, but which looks very different when placed with specimens from other localities. The two chief races in Switzerland are, to a certain extent, divided by altitude; the one typical in Alpine and sub-Alpine regions, the other in the plains; each being subject to considerable variation, and frequently appearing in the converse localities in small numbers. The typical mountain *alveus* are darker, with the white spots on the upperside of the forewing, small in size, and the ground colour of the underside of the hindwing of a yellowish tone, while in the plain form the white spots are much larger, and the ground colour of the underside of the hindwing is usually of a darker shade, and sometimes greenish. In this last particular, however, the plain form is exceedingly variable. *Alveus* is well distributed throughout Switzerland, being more frequently met with in the mountains, where it is one of the commonest (though not the most widely distributed) species of the genus. In the plains, although occurring less universally, it is by no means rare. I have so far come across it in five lowland localities, namely, Follaterre, Vernayaz and Aigle, in the Rhone Valley, a little above Clarens, and Eclépens, and seen a few specimens from the lake of Thoune. The specimens from Eclépens, and some from Vernayaz, are worthy of special notice. While very obviously belonging to the plain form, they are remarkably similar to the mountain race of *alveus* from the Pyrenees. This southern Alpine race makes an extraordinary contrast with *alveus* of the Swiss Alps, and some years ago when first reading Prof. Reverdin's description of *foulquieri*, I was struck with the resemblance between that (then) newly-described species and the Pyrenean *alveus*. The likeness was so great that I sent some specimens to Prof. Reverdin, who subsequently informed me that it was not the first time his attention had been called to this race of *alveus*, M. Oberthür having suggested it was *foulquieri*, or a distinct species. The genitalia, however, do not differ from *alveus*. The Swiss form is racial in the Jura, but, as already noted, it occurs as an aberration at Vernayaz, and I also have a couple of specimens from the Grisons. *Alveus* is single-brooded, and is to be found on the wing by July, appearing just as early (sometimes earlier) at moderate altitudes as in the plains, though, of course, at great altitudes it is later, but never very much. The existing records of the time of flight of *alveus* in the plains are almost useless, as it is impossible to tell whether they are referable to *alveus* or to *armoricanus*, and since the separation of this latter species, many collectors apparently hold the quite erroneous idea that *alveus* is entirely a mountain species. Of course, as a general rule, it will be perfectly safe to assume that the specimens recorded as taken in May and early June are *armoricanus*, particularly if any number have been taken, there can be no doubt on the subject; but, while the facts just mentioned are undoubtedly correct, and *alveus* is beyond question a single-brooded species, on very rare occasions a few prematurely emerged specimens have been taken in the spring, always, so far, isolated examples. I had the good fortune to take such a specimen once, on May 24th, at Branson, in the Rhone Valley. It

was, superficially, most distinctly *alveus*, the only other possibility being that it was a hybrid *alveus* \times *armoricanus*, an idea which was fostered more by the extraordinary date of capture than the appearance of the specimen. As it was, unfortunately, a ♀, anatomical proof of its identity was difficult to come by, so I sent it to Prof. Reverdin. Unfortunately, even in such expert hands, the dissection was not quite a success, and failed to give the desired information; nevertheless, the Professor remarked that the superficial characteristics were so pronounced that he felt no doubt whatever that the specimen was *alveus*. He further informed me that two other ♂ specimens of *alveus*, captured in May, had come to his notice, one from Locarno, the other from the Grand Salève, which latter was taken by M. Rehfoos of Geneva. When one recalls that Prof. Reverdin receives material from all over the Palearctic Region, and that, in spite of this, previous to the capture of my specimen, only two others had come to his notice, it will be readily realised how extremely rare this spring emergence of individuals of *alveus* must be. This then, being the case, the fact that these few specimens have been taken, and the probability that in time others will be recorded, does not appear to be any sufficient reason for regarding *alveus* as anything but a single-brooded species.

July, as has been already noted, is, in the majority of localities, the normal time of emergence of the species, but I have taken it on a few occasions in late June, more often (curiously enough) in sub-Alpine regions than lowland ones, and once at over 5,000 feet, but only three times in more than single specimens. Once, on June 23rd, at Verossaz, above St. Maurice, where I took two ♂s; once in the Ueschinen Tal above Kandersteg, when I took three ♂s, on June 30th, and once at Lenzerheide, in the Grisons, where, between 5,000 feet and 5,300 feet, the species commenced to emerge on June 21st, and from the 23rd on was seen daily in increasing numbers. Other June specimens that I have taken come from Vernayaz, Caux (this latter on June 10th), and the hills behind Clarens. In these latter localities, between my capture of the single specimens and the subsequent emergence of the rest of the brood, there was a period varying from a week at Vernayaz to nearly three at Caux. In early seasons it is probable that the species is often out by the end of June, and I hear from Prof. Reverdin that in some southern localities, such as St. Martin de Vésubie, the time of emergence is late June, but otherwise, in his experience, it is always July. At altitudes over 5,500 feet it is safe to say the species will never be found before the first week in July. But, although *alveus* in the plains appears no earlier than it does some thousands of feet higher up, it also (strangely enough) remains longer on the wing in its mountain habitats. The duration of the period of flight of the species is difficult to ascertain exactly, on account of its very irregular emergence, and necessitates constant observation for quite two months in one locality, if any useful result is to be obtained. In its lowland habitats the species is normally over by early August, but some years it is often to be seen well on in the month, while on one occasion I have taken a ♂ in quite fair condition on September 2nd. The longest period of time I have noted *alveus* on the wing is seven weeks. This was at Lenzerheide (Grisons), between 5,000 feet and 5,300 feet, from June 21st to August 9th, at which date, when I left the locality, it was still about in some numbers, and would certainly

have lasted for another week or ten days. This would give a period of flight of from eight to nine weeks, and exceeds the greatest length I have recorded in the plains: six-and-a-half weeks; *i.e.*, from July 18th to September 2nd. My observations, on the whole, lead me to think that the abundance or rareness of the insect in a given locality is more the deciding factor as to the length of the period of flight, than altitude or climatic conditions, though, of course, the latter, indirectly, may be said to be partly responsible, in as much as it helps to determine the abundance, or otherwise, of the species. The actual life of the individual does not last more than half the total period, if one may judge by the time which elapses between the first appearance of the insect and the first really worn examples seen. Hence, when there is a plentiful supply of individuals, three-fourths of which probably emerge in the first ten days of their season (which is the moment of greatest abundance), and the remainder continue to emerge periodically, we get an extended period of flight. The converse, I have noted, too, on more than one occasion. This irregular emergence is common to all the species of the genus, in several instances to a much greater extent even than shown by *alveus*. But it should be most carefully noted that the irregularity only applies to that fraction of the brood which does not appear with the majority, for the first instalment of all species of *Hesperia* appears with the regularity of clockwork. So much so is this the case that at any given altitude one can foretell what the next species of *Hesperia* to emerge will be with complete certainty. For instance, between 5,000 feet and 6,000 feet, the first species of the season met with will be either *malvae* or *malvoides*, according to the locality, between May 15th and 25th. By the first week in June a large species will be noticed—*andromedae*. About a week later two more species appear at different elevations—*cavaliae* and *serratulae*. Ten days to a fortnight later, by which time the first species will be past its prime, and *serratulae* flying with the others up to 6,000 feet, while they have emerged still higher, and *alveus* will appear; or, if it is a locality where *carthami* occurs, it will precede *alveus* by a few days. About a month will then elapse before *carlinae* puts in an appearance, and about the same time *ryffელensis* will also commence. The same regularity will be found at any level, high or low. I have tested this repeatedly and never found it otherwise; in the plains, too, even the double-brooded species appearing in the most perfect rotation.

The variation shown by *alveus*, as we at present know it, is considerable. Many races are in their extreme form very different, but the transitional forms are always numerous. In spite of this, aberrations of *alveus* are not often very troublesome to identify. Difficulty is only experienced when dealing with aberrations which resemble species very nearly related to *alveus*, which have, as it happens, all been previously treated as varieties of the latter. There are among the Swiss members of the genus only two such species, namely: *armoricanus* and *ryffელensis* (for the latter will, I think, undoubtedly prove distinct). *Armoricanus*, though it bears, in a general way, a closer resemblance to *alveus* than any other Swiss species, can always, with a little care, be distinguished. Typical *alveus* is a decidedly larger insect, and the white markings are proportionately heavier; the ground colour of the hindwings, underside, is not usually so bright in *alveus*;

and finally, *alveus* is single brooded. These are well known facts, and throughout these notes I have made it a point, as much as possible, to avoid descriptions of typical forms, but in this case it was necessary; for both species in question vary on similar lines, and so two aberrations are often best distinguished by the differences which mark the types. *Alveus*, strange to say, rarely produces aberrations suggestive of *armoricanus*, a specimen reduced in size being extremely rare; but the latter frequently approaches *alveus*. (These will be mentioned in notes on *armoricanus*.) From the remaining species, typical *alveus* is easily distinguished, only with the following aberrations will any difficulty arise. The form in which the central spot of the median band on the underside of the hindwings, projects towards the base of the wing, thus assuming the characteristic feature of the B. group species, is not very uncommon; but it is, as previously noted, quite the most important form of variation occurring in the genus, for, with one exception, I have found it in every species of the A. group, and no matter what the species, a specimen of this form usually resembles some member of the B. group. The extent to which the projection from the central spot towards the base of the wing is developed, varies in *alveus* indefinitely; ranging from a mere excrescence, just sufficient to break the straight edge of the band, to a well pronounced tooth, half as long as the spot itself. I have never seen it of exactly the same formation in any two specimens, a feature worth noting for purposes of identification; as in group B., this projection has a more or less distinctive formation in each species. To this form of variation I give the name *extensa*, for it is found throughout the group in the form of more or less pronounced aberrations, which in themselves it would be useless to name, as they never develop the same formation twice in any given species. However, in order to avoid a great amount of repetition with each species it is necessary to name the form of variation, and I do so in a collective manner, to cover it in all stages of development, the diagnosis being, any aberration of an A. group species, presenting to a greater or less extent, the features of the median band (underside hindwing) characteristic of group B. Conversely, I give the name *reducta* to those aberrations of the B. group species which assume the even inner edge to the median band, as in group A., or have their typical markings so modified as to approach it. The *extensa* forms of *alveus* are to be found wherever the species occurs. I have taken more than a dozen of these aberrations both in the lowlands and mountains, in the Valais, Bernese Oberland, and Grisons, and I must acknowledge having recorded as *onopordi*, in the *Entomologist* for 1911, such aberrations of *alveus*, which I had taken in the Pyrenees. I can only hope that my record has not misled many collectors in the past; and add that at that time I was not acquainted with genuine *onopordi*, the only condition which could have made such a mistake possible, for with its much greater size, and totally different character of markings, *alveus* never can be said in the least to resemble *onopordi*. There is one species which some of these aberrations must resemble very closely, namely, *umida*. It does not come within the scope of this paper, but it would be interesting to know if the projection from the central spot in that species (?) has a constant formation, which would enable it to be distinguished from the fluctuating formations of the *extensa* aberrations of *alveus*; especially as there is no difference in the genitalia of

the two species. There is another aberration of *alveus* in which the median band is not rectilinear (but which is quite distinct from the *extensa* form), which is worth noting; for though it resembles no other species in particular, it destroys the typical *alveus*-like appearance of the specimen. In this aberration the costal spot of the median band is lengthened basewards. So far I have seen no specimen in which this spot and its corresponding basal one, are joined, but it is more than likely that such a form does occur occasionally, for I know it to do so in other species.

The ground colour of the underside hindwing is somewhat variable, especially in the plains; but in this respect *alveus* has nothing like the range of variation shown by other species.

(To be concluded.)

Notes and Observations on the Lepidoptera of the Witley District from 1912 to 1919.

By AUSTIN A. TULLETT, F.E.S.

The following notes and observations were made from field-work undertaken by Mr. Joicey and his assistants.

The Joicey Collection of British Lepidoptera was arranged in 1917 by Miss N. Prout, after South's *Butterflies and Moths* of the British Isles, and we are indebted to Mr. L. B. Prout for his assistance in arranging the *Geometridae*. The majority of specimens recorded are in the Joicey collection.

Both night and day collecting was at a standstill from 1914 until 1919, though every opportunity was taken on "collecting days" to add to the collection, and the tree-trunks have been well worked.

Collecting has been done principally by Mr. Joicey, the late Mr. A. Noakes, sen., the late Mr. A. Noakes, jun., Mr. G. Talbot, Mr. L. B. Prout, Miss N. Prout, Mr. W. Hawker-Smith, in 1919, and the writer.

The district worked by us comprises the parishes of Witley, Hambleton, and Chiddingfold, though very little work has been done around Witley village and none on Witley Common.

The following species taken by us are not recorded in:—"A List of the Lepidoptera occurring within six miles of Haslemere," by F. A. Oldaker, M.A., F.E.S., June, 1918:—

Ruralis (*Zephyrus*) *betulae*, L. ♀ recorded by H. Watkins from Hindhead, September 8th, 1917; *Strymon* (*Thecla*) *pruni*, L., *Lymantria dispar*, L., *Nola cucullatella*, L., *Palimpsestis octogesima*, Hb., *Agrotis vestigialis*, Rott., *Apamea ophiogramma*, Esp., *Caradrina ambigua*, F., *Geometra vernaria*, Hb., *Eupithecia satyrata*, Hb., *Eupithecia absinthiata*, Cl., *Oporabia autumnata*, Gn., *Thera obeliscata*, Hb., *Lygria populata*, L.

The most interesting record in this list is undoubtedly that of *Strymon pruni*, which has never been recorded from Surrey before. Eight larvæ were beaten from sloe by the writer in May, 1919, and of these six were reared to the imago.

PAPILIONIDÆ.—Sub-family *Pierinae*.

Pieris brassicae, L.—Common, May. Larvæ common in June and July.

P. rapae, L.—Common, April, June, July. Larvæ common June and September.

P. napi, L.—Common, May and August. Larvæ common June and September.

Euchloë cardamines, L.—Common, May and June. Larvæ common on charlock, July and August.

Leptosia (Leucophasia) sinapis, L.—21st May, 1912; 9th May, 1918; 2nd May, 1919. This species quite plentiful in 1912.

Colias edusa, Fabr.—One ♂, September, 1913; one ♂, July, 1913, Witley; one ♀, July, 1912, Enton, Witley, A. Noakes, jun.

Gonepteryx rhamni, L.—Common, September to May. Larvæ in June-July.

APATURIDÆ.—Sub-family *Apaturinae*.

Apatura iris, L.—One ♂, one ♀, 1912. Three ♂s, one ♀, July 27th, 1917. One ♂, July 27th, 1917; taken by J. J. Joicey. Two ♂s, one ♀, July 27th, 1917, including pair captured at one swoop by W. Hawker-Smith. Several seen flying same day. One ♂, July 9th, 1919, in perfect condition, A. A. Tullett. July 16th, 1919, fine specimen seen flying near Hambledon Common, A. A. Tullett.

NYMPHALIDÆ.—Sub-family *Nymphalinae*.

Limenitis sibilla, L.—Very common at Hambledon and in Chiddingfold district, June and July. Larvæ found on honeysuckle in Hambledon Woods, May and June. In abundance July 9th, near Chiddingfold. Observed settling on horse-droppings near Chiddingfold, on July 11th, 1919.

Eugonia polychloros, L.—Not uncommon, July and August. A good series bred from larvæ found on poplar at "The Hill," June 28th, 1918.

Aglais urticae, L.—Common, June to September. Larva common May and July.

Vanessa io, L.—Common, August-September. Larva very common in June and July, on nettles.

Pyrameis atalanta, L.—Not common. Several were taken during one September.

Pyrameis cardui, L.—One, Witley, May 16th, 1912. This is the only specimen observed.

Dryas paphia, L.—Common in woods, Hambledon and Chiddingfold districts in July. Larva unobserved.

Argynnis cydippe (adippe), L.—Not common compared with *paphia*. Can be taken by the brook at Chiddingfold. July 14th, 1919, fairly common.

Brenthis euphrosyne, L.—Very common in May at Hambledon and in Chiddingfold Woods.

Brenthis selene, W.V.—Very common in Hambledon and Chiddingfold Woods district, in May and June.

SATYRIDÆ.—Sub-family *Satyrinae*.

Satyrus semele, L.—Not uncommon on Hambledon Common in June.

Pararge aegeria, L.—Not uncommon in woods in May and August.

Pararge megera, L.—Common in May and August. Can be taken anywhere in the district; plentiful on Hambledon Common.

- Epinephele jurtina*, L.—Very common in the district June to September. July 9th, in swarms near Chiddingfold.
- Epinephele tithonus*, L.—Common in July and August. Hambledon district.
- Aphantopus hyperantus*, L.—Very common in July and August. July 9th, in abundance at Chiddingfold Woods.
- Caenonympha pamphilus*, L.—Common from May to September.

LYCÆNIDÆ.—Sub-family *Lycaeninae*.

- Ruralis* (*Zephyrus*) *betulae*, L.—One ♀, October, 1919, in "The Hill" Gardens. A series of both sexes bred from larvæ beaten from sloe trees end of May-June, 1919. The adults emerged during July and August. Imago rarely seen on the wing.
- Bithys quercus*, L.—A series taken one July. Five larvæ beaten from oak in May, 1919. Three emerged July, 1919. One taken on wing by W. Hawker-Smith, 1919.
- Strymon pruni*, L.—Eight larvæ beaten from sloe, in May, 1919. Six emerged in July, 1919.
- Callophrys rubi*, L.—Not uncommon on Hambledon Common in May and June, flying round brambles.
- Rumicia phlaeas*, L.—Common on Hambledon Common. First brood, May. Second brood, July, August.
- Plebeius aegon* (*argus*), Esp.—Very common on Hambledon Common during June and July.
- Polyommatus icarus*, Rott.—Common in meadows May to September.
- Celastrina* (*Cyaniris*) *argiolus*, L.—Common at Witley April and May, July and August.
- Cupido minima*, Leech.—Rare in this district, three specimens at Witley, 1918.

ERYCINIDÆ.—Sub-family *Nemeobiinae*.

- Hamearis* (*Nemeobius*) *lucina*, L.—Five, May, 1919, in meadows. One larva found in June, on primrose; spun up end of July. Six, June, Hambledon Woods. Two, taken 1913 or 1914, by A. Noakes.

HESPERIIDÆ.—Sub-family *Hesperinae*.

- Hesperia malvae*, L.—Very common in meadows in Hambledon and Chiddingfold, May and June. One, July 20th, 1918, Witley.
- Nisoniades* (*Thanaos*) *tages*, L.—Common in meadows in May and June.

Sub-family *Pamphilinae*.

- Adopaea flava* (*thaumas*), Hufn.—Common in Hambledon and Chiddingfold in July.
- Augiades sylvanus*, Esp.—Common, Hambledon and Chiddingfold in May and June.

SPHINGIDÆ.

- Smerinthus populi*, L.—July 17th, from larvæ taken off poplars at "The Hill," in August and September. About 30 larvæ were obtained in 1912, but it has not turned up so plentifully since.
- Sphinx ligustri*, L.—One on June 13th, 1912, on a fence. One in August, 1913 (? bred). One larva found at Chiddingfold, August, 1919.

Macroglossum stellatarum, L.—One larva taken off hedge-bedstraw, July 12th. This died at pupation. July, 1919, moth seen flying on Hambledon Common.

Hemaris fuciformis, L.—One in May, 1919, at "The Hill," hovering over rhododendrons. July, 1919, over 100 larvæ taken near Hambledon, on honeysuckle, but nearly all parasitised.—A.A.T. July 7th, 1919, larvæ taken in three stages, and also ova found. Four specimens pupated July 12th, 13th, 14th, and 21st.—A.A.T.

Hemaris tityus, L.—Common, Chiddingfold, beginning of June. A series of 42, June 7th, 1918.—A.A.T. A series of 16, May 29th, 1919. Larvæ found on field scabious, Chiddingfold, in July.—A.A.T.

NOTODONTIDÆ.

Cerura bijida, Hb.—One taken at light, July 7th, 1914, at "The Hill." One larva taken on poplar, at "The Hill," September, 1918, emerged, June, 1919.

Dicranura vinula, L.—Two at Witley, 1915. One larva on poplar, August, 1918, at "The Hill." One brought in from Chiddingfold by a boy, July 20th, 1919.

Stauropus fagi, L.—One on June 20th, 1918, bred from larva found by L. B. Prout, at Witley, in August, 1917.

Notodonta dromedarius, L.—One, August 16th, 1912, Witley.

Drymonia trimacula, Esp.—One, June 4th, 1918, Witley.

Notodonta trepida, Esp.—Eight, Witley, in May and June, 1912. Bred from larvæ taken on oak at Witley, in July, 1911.

Lophopteryx camelina, L.—Two in June, 1912. Three in July, 1912. Taken at light. One in May, 1914.

Pterostoma palpina, L.—One, March 10th, 1913. One, April, 1913. Two, May. One, June, 1912. Two, August 1st, 1912. All taken at light.

Phalera bucephala, L.—Common in June and July at light. Larvæ very common in August and September, 1919, on a lime tree at "The Hill."

Pygaera curtula, L.—Four on May 20th, 1919, bred by L. B. Prout from larvæ taken in Hambledon Woods, September, 1918, on aspen.

Pygaera pigra, Hüfn.—One, May 20th, 1919, from larva, Hambledon Woods, September, 1918, on aspen.

THYATIRIDÆ.

Habrosyne derasa, L.—A good series taken off sugar at Hambledon Woods, end of June and beginning of July, 1914.

Thyatira batis, L.—Eight. June, 1914. One, July, 1914. At light, Hambledon Woods. One, July 15th, 1918, "The Hill."

Palimpsestis octogesima, Hb.—One, July 2nd, 1914, at Witley.

Palimpsestis or, F.—One, July 6th, 1914, Witley.

Palimpsestis duplaris, L.—One, July 23rd, 1914, Witley.

Asphalia diluta, F.—A series, September 6th, 1912, at sugar in Hambledon Woods. One, August 1st, 1913.

Polyplocia flavicornis, L.—One, May 1st, 1914. One August 1st, 1912, Witley.

Polyplocia ridens, F.—One, April, 1913. A series of larvæ beaten from

oak, near Chiddingfold, in June, 1919; spun up in July, 1919. One ♀ emerged February 6th, 1920.

LYMANTRIIDÆ.

Orygia antiqua, L.—Not uncommon on the wing in October, flying in sunshine. Larvæ common on most trees from May to September.

Dasychira pudibunda, L.—Common from May to July on fences, twigs, etc. Larva common on hawthorn, etc.

Porthesia similis, Füssl.—Very common on fences and at light in July. Larvæ very common in May on hawthorn, oak, etc. Pupæ on most fences, trees, etc.

Stilpnotia salicis, L.—One, July 30th, 1912. Three, August 20th, 1913. One, September 10th, 1912. At light near Hambledon.

Lymantria dispar, L.—One, bred August 20th, 1912, Witley.

Lymantria monacha, L.—Not uncommon on tree trunks, and at light, in July, August and September.

LASIOCAMPIDÆ.

Malacosoma neustria, L.—Common in July and August. Larva very common on fruit and oak trees.

Trichiura crataegi, L.—One ♂, Witley, September 27th, 1919. One ♂, two ♀s, bred from larvæ found on sloe in June, 1919, emerged September, 1919.

Poecilocampa populi, L.—One ♂, November, 1911. One ♂, November, 1913. Two ♂s, February, 1914. One ♂, April, 1916. One ♀, November, 1913. One ♀, December, 1913. Larvæ taken June, 1919, on oak.

Lasiocampa quercus, L., f. *callunae*.—One ♂, June 1912. One ♂, July 1st, 1912. Probably bred from larvæ taken at Hambledon.

Macrothylacia rubi, L.—Moth common, flying at dusk on Hambledon Common in late May and June. Larva to be found on bramble from August to October.

Cosmotriche potatoria, L.—Twelve ♂s, four ♀s, Witley, July. Larvæ taken in May and June.

SATURNIIDÆ.

Saturnia pavonia, L.—Seven ♂s, May. Two ♀s, May 1918. One ♀, April, 1919. Larva on Hambledon Common, July and August, 1919, feeding on heather.

Mr. Smith reports the finding of one larva in the last instar in 1919, which carried three ova of a Dipteran (probably a Tachinid) fixed on the dorsum near the head.

I have bred Diptera from the pupæ of this species some years ago.

DREPANIDÆ.

Drepana jalcatoria, L.—Twelve, at Witley, May, June, July, and August.

Drepana binaria, Hüfn.—Three ♂s, May 10th, 1912. One ♀, May 4th, 1912. One ♀, August 16th, 1912. One ♀, May, 1919.

- Drepana lacertinaria*, L.—One ♀, May 1914. Two ♀ s, May, 1918. Two ♀ s, 1915. Two ♂ s, July, 1916.
- Cilix glaucata*, Schiff.—Seventeen, at Witley, May, June, July, and August.

NOLIDÆ.

- Nola cucullatella*, L.—Larva beaten from sloe in June, 1919, near Chiddingfold.
- Nola strigula*, Schiff.—One, Witley, May 27th, 1918. One, Witley, July 2nd, 1918. One, Witley, June 1919, taken on pine tree, opposite "The Hill."

CHLOEPHORIDÆ.

- Hylophila prasinana*, L.—Three, Witley, 1915, Witley, May 20th, 1914, and Witley, June 11th. 1912.
- Hylophila bicolorana*, Fuesl.—Two, Witley, July 1912. One, Witley, June, 1919, bred from larva taken off oak, May, 1919.

SARROTHRIPINÆ.

- Sarrothripus revajana*, Tr.—Four, Witley, August. One, Witley, March 28th, 1918.

ARCTIDÆ.—Sub-family *Arctiinae*.

- Spilosoma menthastri*, Esp.—Moth plentiful at Witley in May and June. Larvæ common in August and September.
- Diaphora mendica*, Cl.—Three ♂ s, Witley, May 1912. One ♂, Witley, May, 1919.
- Spilosoma lubricipeda*, Esp.—Three ♂ s, June, 1912. One ♂, May, 1914. One ♂, June, 1914. Two ♀ s, May and June, 1912. Larvæ reared from ova laid by a ♀ taken in June, pupated in September.
- Phragmatobia fuliginosa*, L.—One ♀ taken at Witley in June, 1917. A series was bred from this specimen. Two or three taken in 1912.
- Diacrisia sannio* (*russula*), L.—Twenty-four ♂ s, June, 1912. Three ♀ s, June 1912. Thirty-one ♂ s, June, 1919. Moth plentiful in afternoon sunshine on Hambledon Common, June, 1919. Thirteen ♀ s, June, 1919. Larva not observed. One ♂, July, 1919, with broad forewings.

Arctia caja, L.

One or two damaged moths taken at Witley, in July. Larva not plentiful, a few found in Witley district in May and June.

Description of a ♀ form, bred at "The Hill Museum," Witley, April 2nd, 1918, from a ♀ taken wild at Witley, 1917.

Forewings.—Ground colour a rich cream, with the brown markings greatly reduced; on right forewing the marginal band disappears altogether, likewise the submarginal, excepting two small posterior spots, and on the left forewing the marginal band is represented by a smudge of brown, submarginal by a small spot in cell 5, overlapping into cell 4, and two small posterior spots. Second and third transverse bands united, forming a heavy V-shaped mark. The first band well separated from the second and third. The brown blotch near base very small.

Hindwings.—Ground colour a pale scarlet with distinct blue-black spots edged with yellow, central spot shaped after a bird's head, a small spot nearer the hindmargin, a row of three spots.

Hipocrita jacobaeae, L.—Moth common in June. Larva common in July and August, where ragwort is plentiful.

Arctia villica, L.—Larva found near Hambledon in April, 1919.—W. H.-Smith. One, June 4th, 1912, taken near Brook Village. Three, June, 1914.

(To be continued.)

SCIENTIFIC NOTES AND OBSERVATIONS.

GYNANDROMORPHS.—As there seems some uncertainty in the general use of the terms "Gynandromorph" and "Hermaphrodite," I have asked Dr. Cockayne if he would kindly write out a full explanation of their application in our scientific communication. He has very kindly sent me the following, which shows that we should restrict the use of the latter term to those specimens of which we have actual evidence that both male and female generating organs are functionally perfect in one and the same individual.

"The terms hermaphrodite and gynandromorph are still used as if they were synonymous and this practice is supported by the definitions given in the larger dictionaries. In the interests of science it would be better to confine the term hermaphrodite to genetic hermaphrodites.

"In these one gonad is an ovary and one a testis, or a gonad in one or both sides consists of a mixture of ovarian and testicular tissue forming an ovotestis.

"The term gynandromorph has a wider meaning and is applied to insects showing both male and female characters in its somatic tissues.

"A gynandromorph may have secondary sexual characters intermediate between those of the fully developed male and female, or it may have them in some parts completely male and in others completely female.

"In the latter case the secondary sexual characters of the one sex may preponderate greatly, those of the other being present merely on a small area of wing surface, or in one antenna, or they may be almost equally represented in the form of a fine or coarse mosaic on both sides, or they may be completely or nearly completely segregated to opposite sides of the insects, one half having the secondary sexual characters of the male, the other those of the female. The term 'intersex' is sometimes applied to insects which show intermediate sexual characters on both sides, or a mosaic of those of the two sexes.

"Some of the mixed or halved gynandromorphs are genetic hermaphrodites, but these cannot be recognised from their external appearance. Unlike those of mammals the secondary sexual characters of insects are not influenced by an internal secretion derived from the gonads.

"Thus the term 'hermaphrodite' should be restricted to insects possessing both ovarian and testicular tissue, whereas 'gynandromorph' can be applied to any insect showing both male and female sexual characters irrespective of the nature of its gonads."

NOTES ON COLLECTING, Etc.

PALATABILITY OF VANESSID LARVÆ.—On 30th April, 1919, I found larvæ, from which I subsequently bred *Pyrameis* (*Vanessa*) *cardui*, extremely abundant along the shore of the Caspian Sea at Enzeli, in N.W. Persia. Large numbers of female House Sparrows (*Passer domesticus*, Subsp ?) were collecting the larvæ and feeding their fledged young upon them. This seems remarkable: not only are the larvæ covered with branched spines, but all sorts of other insects were certainly abundant.—P. A. BUXTON (M.A., F.E.S.), 31, Grange Road, Cambridge.

NOTES ON COLLECTING IN ITALY (1918 AND 1919).—December 8th, 1918.—I returned from England to Arquata Scrivia and found the place enveloped in a sea of fog, which was general in the whole district among the mountains; the mud, too, on the churned-up roads reminded one again of Northern France. On the evening of December 10th two specimens of *Cheimatobia brumata* came to the electric light at the Villa Pisani, and proved to be in fresh condition.

December 16th.—Walking past the village of Vocemola, and ascending the grassy slopes amongst the vineyards opposite the village of Rigoroso, I found many specimens of the grasshopper *Epacromia thalassina*, which took readily to flight when disturbed. In northern Italy this species is very common throughout the summer, and is found late into the winter, to-day's specimens being in good condition, and the only insects of interest on the wing, notwithstanding the warmth of the sun.

December 29th.—Below the village of Vocemola to-day, on the hill-sides above the right bank of the Scrivia, I found a fine female specimen of the beetle *Meloë brevicollis* slowly crawling amongst the dead leaves on the ground. In northern Italy it is rare in the plains, though frequent in the higher altitudes. The four different beetles of the genus *Meloë* found in Italy, viz., *M. proscarabæus*, *M. violaceus*, *M. variegatus* and *M. brevicollis* are collected to form medicines used in veterinary work. Continuing my walk among the fields and vineyards on the hillside, I came across a specimen of the Hymenopteron *Cercasia quadrifasciata*, which collects beetles of various families and carries them to its own nest. Practically all plant-life appears dead, *Clematis vitalba* is every where in seed, and *Rosa canina* and *Euonymus europæus* (the European spindle-tree) are in fruit.

January 1st, 1919.—One doesn't expect to find much stirring in northern Italy at this date, but to-day, just above the village of Vocemola, I found a specimen of the dragon-fly, *Ischnura pumilio*, which flew on to a post in the bright sunshine, and settled there just long enough to be netted.

January 10th.—On the Vocemola side of the river Scrivia I found a specimen of *Gryllus campestris* busily crawling along the damp ground amid fresh grass. The catkins of the hazel were everywhere beginning to be in evidence, and walking along the slopes towards the large fir wood I heard the well-known "buzz" of *Xylocopa violacea*. As I stood motionless it settled on the trunk of a small tree quite close, and then entered a hole in the tree-trunk. A few minutes later another "buzz" announced that the female had arrived, and she, too, disappeared in the tree. This bee seldom ventures far from its winter

quarters at this time of the year, but from the middle of February onwards these bees are to be seen everywhere throughout southern Europe.

January 20th.—A few fresh primroses and the glossy, star-like blossoms of *Ranunculus ficaria*, the Lesser Celandine, have apparently just burst into flower.

January 21st.—I left Arquata Scrivia to-day for Vicenza, which I reached the following afternoon. *En route* I visited the famous Certosa di Pavia, some twenty minutes by steam tram from Pavia Station. This magnificent monastery is one of the wonders of northern Italy, in some respects surpassing even Milan Cathedral.

January 24th.—Nature is more advanced here, at Vicenza, than at Arquata; *Helleborus viridis*, *Ranunculus auricomus*, *Galanthus nivalis* and *Vinca minor* are all well in flower, but the feature of the day is the purplish-blue blossom of *Anemone coronaria* everywhere on the hill-sides around the Villa Pagello, on the top of Monte Berico.

January 26th.—I took my walk this afternoon on the further slopes of Monte Berico, where in May last I found the hill-sides crowded with summer flowers and insect life. More flowers are out to-day, but space forbids me to enumerate them all, except the beautiful blossoms of *Corydalis cava*, hiding in the hedges.

January 29th.—A walk as far as Tormeno, nestled amongst the foothills of a further range of the Monti Berici, convinces me that it is a perfect holiday resort in the season for the naturalist or botanist. The sunset to-day reflects a brilliant glow on the red-tiled roofs and campanile of Vicenza. This glorious city seems unknown to travellers in general from western Europe. Small lizards are running about along the stone walls round our villa under the glare of the hot sun.

February 5th.—To-day Signore Cav. Barrufaldi, of the Vicenza Post Office, brought me a fine large cocoon containing the chrysalis of *Saturnia pyri* (the great peacock moth), which flies commonly in northern Italy from the end of April and throughout May. Signore Barrufaldi also brought me a cluster of eggs of the parasitic Hymenopteron *Microgaster glomeratus*.

February 16th.—The warm sun which rose so strongly this morning, yielding a warmer temperature, announcing that spring had really come, brought out what insect life there was, and to-day I saw a hibernated specimen of *Eugonia polychloros* as it sailed over the garden walls. Amid the ivy leaves around tree-trunks on the warm slopes of Monte Berico, bright yellow male specimens of the Brimstone butterfly *Gonepteryx rhamni* were flying in some numbers, and in such fine condition as to support the contention that this must be a first fresh brood, and not the hibernated specimens of this butterfly that one looks for in early spring in more northern climes, especially as no female specimens were on the wing to-day. The Carpenter bee (*Xylocopa violacea*) has now come out of hibernation, and is busy flying along the hot walls, where the lizards are basking in the sun. Along one of the stone walls, among some dead briars, I found a hibernated male specimen of the Orthopteron *Pachytylus danicus*, one of the migratory locusts. It so happens that to-day, through the kindness of Major A. H. Keenan, I have received a very fine female specimen of this same species, which was found in hibernation at the British headquarters at Tressino. This insect is common in many parts of northern Italy. The female is considerably larger than the

male in the measurements of the body, pronotum and elytra. Large black ants, the workers of the species, *Camponotus ligniperdus* (I believe), are swarming in great numbers over our supply of wood at the Villa Pagello, conspicuous by their longish legs and rather short antennæ.

February 19th.—After two days of rain and fog the sun was very hot, this afternoon, making us begin to think of sun helmets. Descending the slopes of Monte Berico on the western side, I found the fresh males of *G. rhamni* in perfect condition and in greater numbers, with no females flying as yet, thus further pointing to my belief that these males are all an early spring brood, and not hibernated specimens. If anything, they appear to be slightly smaller than the usual July emergence. Grasshoppers were numerous and many were apparently in freshly emerged condition, especially *Stenoderus bicolor*, which is perhaps the most abundant and widely distributed European grasshopper, and very variable in colour; the prevailing form here is brownish, though one fine fresh specimen I took to-day was strongly marked with red. A fine brownish-grey larva of *Phragmatobia juliginosa* was enjoying the hot sun at the very top of a high wall. A few of the solitary bees were flying about the hill-sides and settling on the pretty purple blossoms of *Anemone coronaria*. Amongst these I took specimens of *Nomada solidaginis*. This insect frequents the flowers of the fields and deposits its eggs in the nests of various other species of its own order, the Hymenoptera. I also took a specimen of the allied solitary bee *Coelioxys quadridentata*. This species is not rare on the flowers of the *Papilionaceæ*, on the large umbelliferous tribe, and on some of the Labiate tribe, and lays its eggs in the cells of other solitary bees. A considerable number of specimens of *Coccinella septempunctata* were crawling about on various plants. It is very common everywhere in Italy, in fields, kitchen gardens and cultivated lands.

February 24th.—The very hot sun has brought out the apparently fresh females of *G. rhamni*, and I took two in the most perfect condition, one of which was surrounded by four males as she settled on the ivy leaves round a tree stump. Four males and one female, all in perfect condition, in my net at one stroke, is my record, for this butterfly, at any rate. Odd bright yellow flowers of *Ranunculus bulbosus* are standing out noticeably erect to-day on the hill-sides after the fresh rain, and will shortly be out in profusion.

February 25th.—This morning, on the well in the garden of the Villa Pagello, I took a specimen of the small apterous *Megoplistus brunneus*, a small elongated insect of delicate appearance, with very slender antennæ, and distinguished among crickets by the armature of the hind tibiæ, which bear a fine serrulation instead of spines; it has oval-shaped eyes, and general chestnut colour. This afternoon the imagines of *Apis mellifica* were crowding to the purple-blue blossoms of the beautiful *Anemone coronaria*. A grass snake of grey-black colour scuttled away under a mass of dead leaves before I could diagnose it further, and as I was returning home in the duller part of the afternoon before rain fell, two specimens of *Macroglossum stellatarum* were swiftly searching the blossoms of *Anemone coronaria*, but I was unable to observe the condition of the wings of this moth, which appears in Italy very commonly throughout the fine season in two or more broods.

February 26th.—Single perfectly fresh males of *Pararge megera* and of *Pieris rapae* were flying to-day in the gardens towards the summit of Monte Berico.

February 28th.—This morning an Italian peasant brought round skins of some animals which were all found in the mountains around Schio, a cathedral town of some 11,000 inhabitants, some 15½ miles N.N.W. of Vicenza. I found the skins were of the following animals: viz., Volpe (fox), Puzzola (pole-cat), Donnola (weasel), Fuina (stoat), and Martora (marten).

March 1st.—This afternoon, on the slopes of Monte Berico, I took two fresh specimens of *Pieris rapae*, and hibernated single specimens of *Macroglossum stellatarum*, and of *Polygonia c-album*. I saw also a hibernated specimen of *Vanessa io* sunning itself on the rocky sides of the road which winds up through the gardens—this last insect was in such good condition that it was worth taking, had I been able to reach it. The bees were swarming at the blossoms of *Corydalis cava*, and I got a fine specimen of *Bombus hortorum*, which is everywhere common in northern Italy. This bee greedily visits the various wild flowers daily, but flies off rapidly to some distance at a good height, on any slight disturbance.

March 6th.—The bees *Bombus hortorum* are as busy as ever at the blossoms of *Corydalis cava* this sunless afternoon, though there is no other insect life visible on the wing, but the hibernated velvety caterpillars which will later on produce the moth *Bombyx rubi*, are crawling about the roads, before deciding to enter the chrysalis state. Amid our wood supply to-day I have found specimens of the beetle *Carabus hortensis*, which is found in northern and central Italy in hilly and mountainous districts.

March 7th.—*Pieris rapae* is now out commonly in both sexes, and *G. rhamnii* is swarming. Hibernated specimens of *Vanessa io* and of *Polygonia c-album* are numerous, and many of the latter especially are in excellent condition. Hibernated specimens of *Aglais urticae*, on the other hand, seemed too worn to take. Yesterday, in the Biblioteca Bertoliana at Vicenza, I came across a copy of a book entitled "Entomologica Vicentina ossia Catalogo Sistematico degl' Insetti della Provincia di Vicenza," by Francesco Dott. Disconzi, a priest of Vicenza. This book of great interest, published in 1865 at Padua, though now out of print, and (it seems) extremely difficult to purchase, deals with various orders of insects found in the Province of Vicenza, with copious lists, etc. The following more interesting butterflies are quoted, among others, in this Italian book, as occurring in the Province of Vicenza, viz., *Papilio machaon* var. *sphyrus*, Hüb.; *Thais hypsiphyle*, Fab., and var. *dennosia*, Dahl.; *Parnassius mnemosyne*, L.; *Pieris callidice*, Esp.; *Rhodocera cleopatra*, L.; *Colias palaeno*, L.; *C. phicomene*, Esp.; *Melitaea cynthia*, Fab.; *M. maturna*, L.; *Argynnis pandora*, Esp.; *Nymphalis populi*, L., and var. *tremulae*, Dup.; *Apatura ilia*, Fab., and var. *clytie*, Hüb.; *Grapta L-album*, Hüb., and var. *V-album*, Esp.; *Libythea celtis*, Fab.; *Neptis lucilla*, Fab.; *Limenitis aceris*, Lepech.; *Satyrus ida*, Esp.; *Arge galathea* and var. *leucomelas*, Esp., and var. *procida*, Herbst.; *Lycaena boeticus*, L.; *L. amyntas*, Fab.; *L. telicanus*, Herbst.; *Thecla betulae*, L.; *T. pruni*, L. (Italian = "Tecla del pruno"); *T. w-album*, Ill.; *Polyommatus hippothoë*, Fab.; *P. virgaureae*, L.; *Steropes paniscus*, Fab., etc., etc. I have copied the

names as they stand in the work.—E. D. ASHBY, F.E.S. (*To be continued.*)

RECORDS.—It may be of interest to the readers of the *Ent. Record* to know that I saw a specimen of *Gonepteryx rhamni* fluttering along a hedgerow, on Wednesday, February 18th, at Danbury, Essex. It had rather torn wings and was, I believe, a female. It was a glorious day and quite warm, and for three weeks it has been very mild, dry weather, with a large amount of sunshine in this part of the country, and *Aglais urticae* has been flying here at Chelmsford. The sallow bloom is out also, for I saw a branch in almost full bloom, which a lady had picked, together with some wild primrose blossoms, on February 17th, at Danbury. As these are early records I thought you might like to hear of them.—(Miss) E. MILLER, The Croft, Rainsford Lane, Chelmsford, Essex. *February 21st, 1920.*

GEOTRUPES AND SPARROWS.—On January 16th, at about 12.0 p.m., as I was leaving the riding school at Putney, in Lytton Grove, my attention was attracted by some sparrows which were flying about in an erratic manner. On looking over the fence I saw that the cause of the disturbance was a "Dumble-Dor," which was being pursued by about six sparrows.

Although flying sluggishly he managed to elude them and eventually settled on the ground; but unfortunately I could see no more as the sparrows were alarmed at my presence and had flown off.—G. B. C. LEMAN. *January 23rd, 1920.*

EARLY APPEARANCE OF CELASTRINA ARGOLUS.—In the hope that it may interest your readers, I have to report that I have this day seen a specimen of *C. argiolus* flying in bright sunshine in Bellenden Road, Peckham, S.E.—A. J. WINN, E. Dulwich. *February 17th, 1920.*

THE EARLY SEASON.—Quite early in February the sallow was reported to be out in various places in the South of England. On February 16th the Viburnum blossoms were showing, as were the green buds, and in several parts of Kent on the 20th the damson trees were reported to be in full blossom.—H.J.T.

CURRENT NOTES AND SHORT NOTICES.

In the *Ent. Mo. Mag.* for January, Mr. K. G. Blair announces a beetle, *Abax (Pterostichus) parallelus* as new to Britain. It was taken on the island of St. Mary's, Scilly, in July, 1913. It is closely allied to *A. ater* (*P. striola*) and not uncommon in Central and Western Europe. Mr. E. A. Newbery announces another beetle, *Medon obscurellus* as new to Britain. It has hitherto been confused with *M. obsoletus* in British collections, and has been identified by Col. St. Claire Deville. The specimens were taken in haystack refuse in Surrey many years ago. There are also several interesting communications on the subject of insects damaging lead and other metal-work.

In the *Ent.* for January is recorded a new aberration of *Plusia pulchra* in which the "usual golden Y-mark is replaced by a large wedge-shaped golden blotch." The specimen is unusually brilliant

and has an increase of the pink shaded area. It was taken on the hills near Gloucester by Mr. C. G. Clutterbuck. Mr. F. G. Whittle announces a species of *Tortrix* new to Britain, *Ancylis tineana*, taken by him at Rannoch last June among *Erica* and *Vaccinium*. It appears to be common in Central and Northern Europe.

The *Ent. News* for January contains a most interesting article, "An unusual Case of Parasitism on *Clastoptera obtusa* (Hem.), by a Dipteran, *Drosophila inversa*." The Hemipteron is one which forms spittle masses on alder. These masses are frequently found to be inhabited not only by the larva of the Hemipteron, but by the larva of the Dipteran as well, some lying loose in the mass, but most attached to the host by their caudal end. "It seems to be parasitic only in so far that it utilizes the excess of sap drawn from the plant tissues by the spittle insect."

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

December 11th, 1919.—Dr. Boulanger, F.R.S., read a Paper on "Batrachians," illustrated with lantern slides.

January 8th, 1920.—NEW MEMBERS.—MESSRS. T. H. Grosvenor of Redhill, F. W. Cocks of Reading, O. R. Goodman and A. de B. Goodman of Goswell Road, H. L. Gauntlett of Putney, R. Swift and H. Garrett of Bexley, were elected members.

RACES OF *P. AEGON*.—Mr. Lister exhibited his local races of *Plebeius aegon* and gave an account of his observations on the mosses of Witherslack, where the race *masseyi* is the dominant form.

Local series and special forms of the same species were exhibited by Messrs. Buckstone, Mera, Sperring, B. S. Williams, A. E. Tonge, and Swift.

A discussion ensued. The problem was "What are the causes which produce the *masseyi* form and make it dominant in the small area at Witherslack?"

A further considerable number of species from the Digby collection of *Tinea* about to be placed in the Society's cabinet were exhibited.

ABERRATION OF *R. BETULAE*.—Mr. Tonge, an underside of *Ruralis betulae* with a curious perfect circle beside the normal narrow silvery band.

RARE *PAPILIO*.—Mr. Moore, the very rare *Papilio nobilis* from E. Africa.

PUPATION IN NYMPHALIDS.—Mr. Bunnett read notes on, and showed photographs of, the act of Pupation in the *Nymphalidae*.

January 22nd, 1920.—THE ANNUAL MEETING.—The Balance Sheet and the Report of the Council were presented and passed. The Annual Address was read by the retiring President, Mr. Stanley Edwards. Mr. K. G. Blair, B.Sc., F.E.S., the new President, then took the chair, and the usual votes of thanks to the retiring officers were passed. At the Ordinary Meeting which followed, Mr. H. Morell, of Wallington, and Mr. S. W. Harvey, of Sydenham, were elected members.

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Duplicates.—Grossulariata var. *lutea*, *lacticolor*, *varleyata*, *fulvaticata*, etc. *Desiderata.*—Other extreme forms of Grossulariata, or good vars. of *Diurni*.—*Rev. G. H. Raynor, Hazleleigh Rectory, Maldon, Essex.*

Desiderata.—*Euchloë cardamines* from Ireland; also types of *E. cardamines* from Switzerland, Italy, S. France; var. *turritis* (S. Italy), var. *volgensis*, var. *thibetana*, and of *E. gruneri*, *F. euphenoides*, *E. damone*, and any palearctic species of the genus. *Duplicates.*—*Lowia doris* and vars., a few minor vars. of *R. phœas* (British), and many British lepidoptera.—*Harold B. Williams, 82, Fife Avenue, Stoke Newington, N.*

Desiderata.—Foreign examples, local races, vars. and abs. from all parts of the world of any butterflies included in the British list. Setting immaterial; exact data indispensable. Liberal return made.—*W. G. Pether, "Thelma," 4, Willow Bridge Road, London, N. 1.*

Duplicates (all Clydesdale).—*Ethiops*, *Selene*, *Icarus*, *Phœas*, *Hectus*, *Mundana*, *Perla*, *Fulva*, *Nectitans*, *Tritici*, *Chi*, *Boreata*, *Cambria*, *Belgaria*, *Immanata*, *Olivata*, *Tristata*, *Boreata*, *Mercurella*, *Angustea*, *Dubitalis*, *Ambigua*, *Truncicolella*, *Dercopitalis*, *Kuhmella*, *Fusca*, *Margaritellus*, *Hortuellus*, *Hyemana*, *Phryganella*, *Ferrugana*, *Solan-drinana*, *Sponsana*, *Conwayana*, *Stramineana*, *Rivulana*, *Urticana*, *Octomaculana*, *Perlepidana*, *Vaccinana*, *Geminana*, *Herbosana*, *Myllerana*. *Desiderata*—Numerous, especially.—*A. A. Dalglish, 7, Keir Street, Glasgow.*

Duplicates.—*Phigalia pendaria*, melanic and intermediate forms in great variety.

Desiderata.—Numerous common species.—*M. Corbett, 3, Thorne Road, Doncaster.*

Mr. Donisthorpe will still be glad to receive ants and Myrmecophiles from all parts of the British Isles, and to name any such for anyone who is kind enough to send them to him. He would however suggest that ants from any other parts of the world be sent to his colleague, Mr. W. C. Crawley, 29, Holland Park Road, W. 14. Mr. Crawley is specialising on the ants of the world, and it is a matter for congratulation that we should possess an Entomologist in this country whose whole attention should be concentrated on this branch of Entomology.

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m.: 1920, March 24th; April 7th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge.—*Hon. Sec.*, Stanley Edwards, 15, St. German's Place, Blackheath, S.E. 3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society).—Hall 20, Salisbury House Finsbury Circus, E.C. The First and Third Tuesday in the month, at 7 p.m. Visitors invited. *Hon. Sec.*, J. Ross, 18, Queens Grove Road, Chingford, N.E.

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RICHARD S. BAGNALL, F.L.S., F.E.S.

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On Emergence of the Grypocera and Rhopalocera in relation to Altitude and Latitude.

Illustrated chiefly by the Sibillini Mts. (Central Italy) and by the Baths of Valdieri (Maritime Alps).

By ROGER VERITY.

Orazio Querci kindly undertook in 1918 to take notes regularly of the abundant material which the Signora Clorinda and the Signorina Erilda collected during all the good season in the Sibillini Mountains (Piceno) at Bolognola and in the surrounding mountains. at a height of 1200 to 1800 m.¹ This has allowed me to form a sufficiently exact idea of emergence at the highest altitudes at which an abundant and varied lepidopterous fauna exists, and has allowed me to complete other observations made by me in some localities of Tuscany (Abetone, 1300 m.², Vallombrosa, 1000 m.³, Prato Fiorito, 1000 m.), and at the Baths of Valdieri, 1375 m., in the Maritime Alps.⁴ By this comparison I have obtained an agreement of data really notable, and I believe that the following rules derived from them may be applied to what occurs in all the great mountain ranges of Europe.

As regards the mountains of the Italian peninsula we have generally a tendency to an exaggerated idea of the modification produced by altitude in the emergence of the different species; this is chiefly owing to the exaggerated value given to the number of broods in the plain by mistaking the graduated emergence of some common species for a series of generations. (*Vide* my paper on "The Various Modes of Emergence, etc.," in *Ent. Rec.*, xxxi. p. 66). It is found instead that reproduction greatly resists the effect of altitude and of the resulting shortness of the good season, partly by shortening the period of emergence of the different broods: "graduated" emergence is almost abolished and "long" periods of emergence are often reduced to "short" ones. The altitudes at which the Quercis have collected are the highest reached in our region by the species which extend to the plains; the mountains round Bolognola are a good example and a proof of it; all the trigenates, except *rhamni*, and all the bigenerates, except *hylas*, completely disappear above 1300 m., at which height a zone begins inhabited only by strictly mountain species and by *acteon* and *arion* amongst the other annuals. Up to 1300 m. no species seems to meet with conditions which prevent it from producing as many broods as it produces in the plains.

The contrary is the case in the Alps, as we shall see, where nearly all the species emerge so late in summer that they would not have time to complete another cycle in the same season. In Central Italy the I. brood of the trigenates emerges a month late compared with

¹ A Catalogue and Description of the Lepidoptera collected in this region in 1912 and 1913 has already been published by me in the *Bull. Soc. Ent. Ital.*, xlvii. pp. 45-78 (Dec. 16th, 1915).

² "Elenco di Lepidotteri Ropaloceri dell' Alto Appennino Pistoiese." l.c. xlv. pp. 139-154 (1914).

³ "Elenco dei Lepidotteri della Vallombrosa (Appennino Toscano). l.c. xxxviii. pp. 20-51 (1906).

⁴ Turati and Verity. "Faunula Valderiensis nell' Alta Valle del Gesso." l.c. xlii. pp. 170-265 (1911) and xliii. pp. 168-235 (1912).

the end of emergence on the plain, and in the case of precocious species of the plain even three months late compared with the commencement, but the II. brood in the case of the greater part of these species flies, notwithstanding, in the second part of July, with only a delay of one month compared with those of the plain, and leaves ample time for the III. to be produced, as in fact is verified in various species. There is no delay as in the first two broods, but it appears simultaneously with the III. of the plain; in fact, in *napi* it is clearly in anticipation, flying together with the other species at the end of August and the beginning of September instead of in the second half of September, after the other species, as in the plain. Therefore, what happens in these mountains is a simple "suppression" of one or two broods, similar to the suppression in many localities of the plain and in many seasons, but more frequent and more marked. That it is a case of suppression simply for local reasons and only indirectly by reason of altitude is shown by the fact that often even the suppressed broods are represented by a few sporadic individuals, who appear at the season at which the entire brood ought to emerge, and also by the fact that the suppression follows, more or less, the same order as in the plain, beginning with the tertiary brood, and then reducing or abolishing the secondary brood. A fair idea of it can be drawn from the material collected by Querci in the Sibillini concerning the 25 trigenerate Italian species, which are also the European ones¹, bearing in mind, however, that local and annual factors intervene; to these is doubtless to be attributed the absence of *alceae*, *cleopatra*, *manni*, *machaon* and *dia*; and that only a single individual of *argiolus* and of *aegeria* was found, because I have observed some specimens of *cleopatra* and of *manni* in other localities equally elevated (Vallombrosa and Valdieri), of *dia* at Vallombrosa, and the other species mentioned are not rare in many mountains; *ergane* has been collected in the Sibillini, but has not been searched for continuously. Of *Erynnis boeticus* only one or two specimens were found at the end of June. I must note that Foulquier was certainly led wrong by the "summer pause" when he attributed four broods to this species in Oberthür's *Ét. Lép. Comp.*, xvi., p. 255. It has three like *altheae*.

The remaining trigenerate species can be divided as follows:—

The first and second broods suppressed or almost suppressed: *Croceus (edusa)*, *daplidice*, *rivularis (camilla)*.

The second and third broods suppressed: *podalirius*.

The third brood suppressed: *medon*, *rhanni*, *hyale*, *sinapis*, *brassicae*.

With three broods: *altheae*, *phlaeas*, *dorilis*, *napi*, *rapae*, *megea*, *lathonia*.

With regard to double-brooded species it may be remarked that

¹ The fact should be noted that all the trigenerates, except *ergane*, have a very extensive distribution in the Palearctic region; *vice-versa* the much localised and characteristic species of limited faunæ are all annual, except *corinna* and two or three of the double-brooded non-Italian. The bigenerates have also in the great majority of cases a great diffusion. The European non-Italian species, which probably have three broods, are only: *G. farinosa*, *P. krueperi* and *P. chloridice*, *Colias chrysotheme*, *C. erate*, and *C. myrmidone*, *P. feisthameli* and *Leptostia croatica*.

various species of the 41 of peninsular Italy¹ never ascend the mountains, and therefore are absent in the Sibillini (*dispar*, *aragonensis*, *ilia*, *jasius*); three others on the contrary are always limited in peninsular Italy to the high mountains, and to only one brood (*carthami*, *parthenie*, *euphrosyne*). To the local causes mentioned above for the triple-brooded must be ascribed the absence of *thersamon*, *idas* and *ligurica*, and the extreme scarcity of *didyma* and *phoebe*, found once only in August: these specimens had the characteristic appearance of II. brood. For *phoebe* this is explained because the II. brood is specifically the primary one, but in the case of *didyma*, which has a partial summer emergence as a rule even in the plain, the phenomenon seems abnormal; of *alcetas* one ♀ of the I. brood has been found. It is worth noting that sporadic individuals, like these, or *argiolus* and *aegeria* above-mentioned, or *aegeria* and *megeira* found once only at Valdieri, are nearly always females and bear on their wings the signs of a certain age. It will be interesting to observe by multiplying the observations, whether there is not found to be a migration to some distance of some fecundated females more frequently than has hitherto been suspected, and that would explain the mysterious disappearance and abundant re-appearance of some species in some localities from one year to another. The other bigenerate species of peninsular Italy are found in sufficient abundance in the valley of Bolognola and can be divided as follows:—

The I. brood suppressed: *onopordi*, *armoricanus*, *carthami*.

The II. brood suppressed: *malvoides*, *sylvanus*, *baton*, *semiargus*, *argus*, *sebrus*, *lucina*, *arcania*, *maera*, *cinxia*, *parthenie*, *cardui*.

With two broods: *tages*, *foulquieri*, *sao*, *thetis*, *hylas*, *thersites*, *icarus*, *minimus*, *pamphilus*, *io*, *urticae*, *polychloros*, *c-album*, *eegea*, and probably *celtis*, which was collected in June but which seems to behave like some *Vanessidi*, emerging also in the autumn and hibernating. It is to be noted that the suppressed brood is always the second brood of the plain, and in many cases is often suppressed also in the plain. The only exceptions are *maera* and *cardui*; wherever I have collected the first in high mountains I have found that the I. brood was primary or only the I. brood existed; the contrary to what happens in the plain; as to the second we have in 1917 observed the suppression of the II. brood, even in the environs of Florence, therefore this phenomenon does not appear to be related to the altitude. We have just remarked that the time of emergence of the I. brood of the trigenerates did not at all impede the development of the other two broods. With still more reason can we say this of the bigenerates. The species which in the plain have a compact emergence in the second half of the spring emerge instead in the district of Bolognola at the beginning of summer, with about a month's delay (*thetis*, *arcania*, *maera*). The graduated emergence of the plain is shortened and becomes compact, so that the beginning is displaced even by two months, receding from April to June (*tages*, *malvoides*, *sao*, *thersites*,

¹ The rest of the Italian non-peninsular bigenerates are: *orbifer*, *orion*, *argiades*, *theophrastus*, *duponcheli*, *belemia* (Sardinia? if a bigenerate at all!), *corinna*, *trivia*, *selene*, *levana*. The other European species are: *marloyi*, *proto*, *tessellum*, *cribellum*, *ottomanus*, *amphidamas*, *fischeri*, *balcanica*, *aceris*, *deione*, *xanthomelas*, *l-album* (II.?).

icarus, *pamphilus*), or from the beginning of May to the end of June

(*cardui*); an exception is *sylvanus*, which preserves its graduated emergence of about two months duration, and flies from the end of June to late August, instead of from May to the beginning of August. This is not surprising because even in the plain this species is mostly annual and almost essentially produces the second brood partially. It is, therefore, natural that in the mountains it should follow the rule of the annuals. Finally, the double-brooded species with a late I. brood in the plain (June and beginning of July) emerge at the same epoch even in the high mountain (bigenerate *Vanessidi*, except *cardui*, and *L. celtis*). As regards the II. brood it appears that it does not suffer like the I., a delay in the epoch of emergence and a shortening in duration, but that instead it emerges, species by species, at the same season as in the plain. The short and precocious emergence of *tayes* takes place during the first days of August, that of *sao*, of *hylas*, and of *minimus* during August, that of *thetis* in the first decade of September, those of *foulquieri*, and of the bigenerate *Vanessidi* in September; the graduated emergence of *thersites*, of *icarus*, and of *pamphilus* are also graduated but only from the end of July to the beginning of September.

The annual species follow the simple rule of emerging at the epoch which in the high mountain best corresponds with the season in the plain, therefore the species which in the plain begin to emerge precociously in April fly in June or during the first days of July (*cyllarus*, *rubi*, *cardamines*¹); those of May fly from the end of June to about the 20th of July (*lucina*, *crataegi*, *cinxia*); those of June fly from July till the beginning of August (*lavaterae*, *hava*, *acteon*, *alciphron*, *amandus*, *spini*, *ilicis*, *acaciae*, *jurtina*, *galathea*, *japygia*, *cydippe*=*esper*; thus the delay is reduced from two months to one month or less, until the species proper to July (*arion*, *quercus*, *dorus*, *atalanta*, *antiopa*, *io*) fly contemporaneously at all altitudes. The same happens for those species proper to July-August (*meleager*, *tithonus*, L., *semele*, *hermione* L. [= *alcyone*], *paphia*), and for those proper to August only (*comma*, *coridon*, *briseis*), in the same way as at this season the II. brood of double-brooded, and the III. of triple-brooded species do not suffer modifications, when not entirely suppressed.²

The annual species exclusively of the high mountain, or which are such in Central Italy³ can be divided into several categories, according to the epoch in which they emerge:—

June and beginning of July: *stygne*, *euphrosyne*.

End of June to 20th July: *serratulae*, *hippotoë*, *mnemosyne*, *tiphon*, *ceto*, *parthenie*, *niobe*.

¹ This species was not found by Querci without doubt, because it has a short and very precocious emergence at the beginning of June, corresponding to April of the plain, as has been observed in other localities of the high mountain.

² The annual species of peninsular Italy which have not been found in the Sibillini are the following: Existing in the high mountain and probably wanting only for local reasons: *lineola*, *boetica*, L., *telicanus*, *betulae*, *circe*, *major*, *daphne*. Very local or belonging to more southern regions:—*nostrodamus*, *morpheus*, *fritillum*, Hb.?, *carlinae*?, *alcon*, *arcas*, *iolas*, *pruni*?, *euphenoides*, *iphis*, *arge*, *aurinia*, *pandora*. Never found above 1000 m.: *lefebvrei*, *sidae*, *escheri* (it is to be noted that this species in peninsular Italy is scarce in the mountains, whereas in the Alps it is abundant at great heights), *w.-album*, *crameri*, *hypermnestra*, *ida*, *lupinus*, *dryas*, *statilinus*, *hecate*.

³ The remaining species not found in the district of Bolognola are: *cacaliae*, *eumedon*, *medusa*, *euryale*, *glucialis*, *goante*, *pales*.

1st to 20th July: *epiphron*, *gorge*, *ligea*, *aglaia*.

15th July to 10th August: *tithonus* (= *eros*), *apollo*, *lycaon*, *cordula*.

End of July to late August: *virgaureae*, *damon*, *dolus*, *tyndarus*.

15th August to beginning of September: *alveus*, *carthami*, *neoridas*.

* * * *

A study of the modes of emergence with respect to altitude in a vast and varied mountain range like the Alps would doubtless furnish interesting data, but I must leave it to those who have a better knowledge of that region than I have. I must limit myself to some observations on the only locality which I have explored sufficiently well during various years: the Baths of Valdieri in the valley of the Gesso (Maritime Alps). The altitude is the same as that explored by Querci in the Sibillini, but the climatic conditions are very different, both on account of the more northern latitude, and of the neighbourhood of the great Alpine glaciers. The fauna offer "high-mountain" characteristics much more marked on account of the morphological appearance of the races and on account of the much greater number of species proper to the great altitudes, and of the very small number of individuals or the total absence of many species of the plains. The favourable season for the perfect insect is limited to little more than two months, and that in which larval activity is possible to little more owing to the early and late snowstorms. Therefore the Baths of Valdieri precede very little that zone of highest altitude at which the normal development of *Grypocera* and *Rhopalocera* is possible, and which is inhabited almost exclusively by its own proper species, analogous to the arctic. Turati and I have found this glacial fauna a little higher than the Baths, in the Vallasco Valley, at 1700m.; in peninsular Italy it does not exist at all, not even on the tops of the mountains which surpass that height, and the corresponding zone is inhabited by mountain species, which in the Alps descend much further down. It is natural therefore that in conditions with such special environment emergence should take place very differently from what happens in the mountains of peninsular Italy. The phenomena produced by altitude as regards the broods no longer consist of simple reduction of the number of individuals or in suppression of one or two broods in the sense above indicated, but consist in the reduction to one single annual cycle of all the species (except a few rare trigenerates) owing to the impossibility of producing a greater number during the very short favourable season. Besides, whilst in other climatic conditions the annual species are partly precocious and partly tardy, here their emergences all group together so as to adapt themselves to the short period above mentioned, and between the beginning of such extremes as *cyllarus*, *cardamines*, *euphrosyne* on the one hand, and of *virgaureae*, *tyndarus*, *neoridas* on the other, there remains but little more than three weeks, from the end of June to the end of July. Apropos of this I must allude to the really notable delay which *meleager* suffers, emerging much later than the other species (in the second half of August) instead of in a middle period compared with the others, as in the plain (July), or in the Sibillini (end of July to late August). I do not know of other examples of this phenomenon, but I have observed that in Tuscany this same species tends to reproduce it: in the lower hills of Florence it emerges in July;

instead, in the Apennines, at about 700m., it begins to emerge only at the end of the month or at the beginning of August, whilst we have seen that the other annual species of July do not suffer any delay. It is not a question of a delay of the same kind in the case of other annual species, such as *alciphron* and *escheri*, because the beginning of their emergence is only retarded from June to July, which is the general rule for the June species; if the end of the emergence is delayed actually for two months in the Sibillini for *alciphron* (beginning of September), and for six weeks at Valdieri in the two species, this happens because in those localities the emergence from being short becomes very long, the greater part of the males emerging from the first to the last days of July and the females from the last days of July to the last of August. In localities less elevated (M. Senario, 700-800m., near Florence) and even at the height of 1,000m. and more, above Covigliaio, I have found that the males of *alciphron* emerge in June and the females in the first half of July; *escheri* at Covigliaio appears at 900m. in very small numbers at the same time, whilst in the plain, and on the hills near Florence, it emerges during a period of twenty days in June. All this proves that *alciphron* in Italy in the high mountains finds conditions better adapted to its development, and that the summer heat and drought stops its development lower down. The same may be said of *lineola* and *flava* (= *thauomas*). I have just mentioned that Alpine *escheri* behaves in the same manner, whilst on the contrary *escheri*, race *splendens*, of peninsular Italy behaves in exactly the opposite one. The species which evidently have a greater development in the higher zone than in the lower might be called "SEMI-MOUNTAIN." Other annual Italian species with this specific biological character are: *arion*, *coridon*, *daphne*. Amongst the bigenerates the following have it; *hylas*, *semiargus*, *argus*, *maera*, *urticae*. Amongst the trigenerates only *altheae* and *lavaterae*. The other intermediate grades between the purely mountain species and those proper to the plains, are represented by those above mentioned which inhabit also the mountains at moderate heights, but become scarcer as the altitude increases.

Returning to the question of the change of the epoch of emergence in the high Alpine localities, such as I am illustrating in the example of the Baths of Valdieri, we remark that of the 49 bigenerate species of Northern Italy there exist in this locality only the following 22: *tages*, *carthami*, *sylvanus*, *sao*, *orion*, *hylas*, *icarus*, *semiargus*, *argus*, *idas*, *minimus*, *lucina*, *pamphilus*, *arcania*, *maera*, *cinxia*, *phoebe*, *euphrosyne*, *cardui*, *urticae*, *polychloros*, *c-album*. Of these some have been found only in the cases of two or three individuals, very old, probably immigrants from the less elevated part of the valley: *sao*, *pamphilus*, *phoebe*, *cardui*. All these species, except *urticae* and *c-album* have only one brood in July (*semiargus*, *minimus*, and *arcania*), or in July and beginning of August, and therefore in the intermediate epoch between the emergences of the broods when two exist. The appearance of the insects is always that of the I. brood. Of the 25 trigenerate Italian species three only are absent at the Baths of Valdieri: *ergane*, because it is excessively local in north Italy, *podalirius* and *dia*. The following six have been found only as sporadic individuals: *cleopatra*, *croceus*, *daplidice*, *megera*, *aegeria*. The others are found:—With one brood: *alcaeae*, *altheae*, *dorilis*, *medon*, *machaon*, *rivularis*, *lathonia*. With two broods: *phlaeas*,

rhamni, sinapis, rapae. With three broods: *argiolus, napi, brassicae*. The first lot mentioned emerges either in July (*altheae, machaon*), or in August (*dorilis, medon*), or during these two months; they have the characteristics of the I. brood, except *rivularis*, which has those of the II. brood. The second lot emerges first at the end of June and in the first days of July, then again in August, but precocious individuals appear sometimes even at the end of July, when the old ones of the I. brood are still flying; thus it happens that the I. emerge when in the plain the II. is flying, and that the II. emerges between its own epoch and that of the III. brood. In *rapae* the morphological characteristics of the two last broods of the plain are found mixed in the II. during all the emergence. Of the species with three broods the II. begins towards the 10th July, when the late individuals of the I. are still numerous; the III. begins towards the 10th August, and I have both seen it flying and reared it from the 15th to the 25th from eggs laid towards 15th July by a female of the II. brood of *napi*; the three broods are distinguished by the same characteristics as those of the plain. I have observed at the Abetone, in the Pistoia Appennines, that *napi* had three broods brought near to each other exactly as at Valdieri and at the same epochs, owing to the delay of three months of the beginning of the I. as compared to Florence, of two months of the II., and owing to one month's anticipation of the III. The heat and drought probably delay this last in the plain.

(To be continued.)

The Ants of France and Belgium.*

By H. DONISTHORPE, F.Z.S., F.E.S.

"It is practically impossible up to now to determine with certainty any European ant."—With this astounding statement Mons. Bondroit begins his work! It would thus appear that the work of all those myrmecologists who have come before him is of little, if any, value, and it has been left to the author of the Ants of France and Belgium to set the matter straight! We can only say at once that for our part to name any European ant with certainty by the aid of Mons. Bondroit's book is not only practically, but absolutely impossible.

Let us consider for a moment the work of three of the greatest authorities on ants in the World—Emery, Forel, and Wheeler, and see how far they have dealt with the European species. Forel in 1874 published his celebrated *Fourmis de la Suisse* which, in spite of the fact that it is naturally a little out of date, after all these years, is still justly regarded as one of the best books ever written on ants; moreover in 1915 he brought the systematic part of the work up to date. Emery in his *Palaeartic Ants*, 1908-1912, has dealt with most of the European genera; and in 1916 he published a fine systematic work on the ants of Italy. Wheeler has published various notes and papers on European ants; and in 1913 a revision of the ants of the genus *Formica*, which of course embraced the European species. In none of the works of these authors are Bondroit's fancy species to be found.

* *Les Fourmis de France et de Belgique*, par J. Bondroit, *Ann. Soc. Ent. France* 87 1-174 J-figs. 83 (1918).

The two following quotations (taken from Wheeler) justly describe the aims and sentiments of myrmecologists "up to now." "Myrmecology has been more fortunate than many other branches of entomology in the men who have contributed to its development. These have been actuated, almost without exception, not by a mania for endless multiplication of genera and species, but by a temperate and philosophical interest in the increase of our knowledge." [*Ants* 1910 123].

"The myrmecologist is being so constantly impressed with the great structural variations that may exist in the same colony of ants, and often therefore among the offspring of the same mother, that he is apt to be a 'lumper' with a vengeance." [*Proc. Amer. Phil. Soc.* 58 26 (1919)].

Alas! Bondroit has done all he can to prove himself totally unfitted to be included in these quotations. In his book he describes no less than 24 new species and 12 new varieties; often from a single specimen, and not taken by himself, and consequently he can know nothing whatever about the colony whence it sprang. Furthermore there are also 6 new species and 2 varieties which he had described before, thus making a total of 30 new species and 14 new varieties for France and Belgium! Either these countries must be much more favourable for ants than any others in Europe; or collectors elsewhere must be much less skilful; or students of other faunas do not possess sufficient acumen to detect the differences between Bondroit's species and those heretofore recognised as occurring in Europe!

Let us now return to the Introduction of this unique work. As the author does not approve of the terms "race" or "subspecies," terms which are recognised by all myrmecologists (and whose use is thoroughly explained by Wheeler in his *Ants*, page 131), he proposes to drop them; and he also substitutes the termination *itae* instead of *inae* to the subfamilies, which is not only contrary to the usage of all other myrmecologists, but is in direct contradiction to the rules laid down by the International Code of Nomenclature. His suggested classification of the ants as a whole is still more bewildering; it is as follows:—

"Sous-famille <i>Formicitae</i>	{ tribu <i>Dorylini</i> .
	{ tribu <i>Formicini</i> .
	{ tribu <i>Ponerini</i> .
Sous-famille <i>Myrmecitae</i>	{ tribu <i>Myrmecini</i> .
	{ tribu <i>Dolichoderini</i> ."

Thus the "*Ponerini*" and "*Dolichoderini*" with a one-jointed pedicel are put in the same subfamily as the "*Myrmecini*" which possess a two-jointed pedicel. Furthermore no notice is taken of the fact that the gizzard in the "*Dolichoderini*" is quite unlike those of any of the other subfamilies. Comment is superfluous.

Next follow certain "generalities" on ants, which consist of three pages of crude statements, often quite inaccurate—thus the wings of female ants are said "to fall off naturally at the end of a few days"; as is well known to all those who have taken the trouble to study the habits of ants, the fertilised female removes her wings by working them backwards and forwards, pulling them with her legs and mandibles, or rubbing them against twigs, grass stems, or anything handy—*Messor barbarus* is placed in a category of ants

which are said to possess monomorphic ♂ ♂, on page 11 Bondroit figures a large and a very small ♂ of this species, and the intermediate forms are known to exist; this does not appear to be exactly monomorphic, but rather distinctly polymorphic—for Wheeler's useful and recognised term "gynaecoid ♂," the unnecessary and objectionable name of "gynoides" is invented—pseudogynes are said never to exceed in size that of the ordinary ♂; whereas, as is well known, both macro- and micro-pseudogynes occur—*Tetramorium* is given as an instance where the different size between the ♀ and ♂ is considerable; this is by no means always the case in this genus—*Formica sanguinea* is said to occur only accidentally without slaves; Forel and Wasmann have both shown that when colonies of *sanguinea* have reached a certain age, and size, they may give up the keeping of slaves altogether, and certainly not by accident.

Similar inaccuracies are not infrequent in the very short account given of the "foundation of the nest and population"—"*Formicina flava*" is said to possess another "yellow ant" as a parasite; this we consider to be highly improbable, numerous experiments by Crawley, myself, and others go far to prove that this ant will not accept strange females even of its own species—*Ponera coarctata* is said to have only some 20 individuals in its colonies; various records occur of more populous colonies—*Myrmecina graminicola* is stated to consist of only a few more individuals than *Ponera*; very large colonies of *Myrmecina* are found—*Formicina fuliginosus* is said to make its carton nests in hollow trees; as is well known this ant builds its nests quite as frequently in the ground, as in trees, and sometimes in cellars and roofs—Forel is said to pretend that the presence of a large number of myrmecophiles, such as *Lomechusa* and *Atemeles*, in an ant's nest will cause the extermination of the same; it was not Forel at all who proposed this theory, moreover Bondroit has evidently got mixed up over Wasmann's well known "Pseudogyne theory," which he does not understand.

The external characters are next dealt with, and it is a pleasure to be able to praise the author's drawings (both here and throughout the book) which are undoubtedly the best part of the work. Under "Nervation" the author gives names to the cells and nerves of the wing which do not agree with the systems used by André, Cockerell, Emery, Forel, Jurine, Mayr, Saunders, Sharp or Wheeler. There can be no object in inventing a system different from that used by anyone else.

We now come to the systematic part of the book—in all recognised modern works on ants the order of the subfamilies is as follows:—*Ponerinae*, *Dorylinae*, *Myrmicinae*, *Dolichoderinae* and *Camponotinae*. This is not a haphazard arrangement, but the final conclusion drawn from the study of ants since the time of Latreille to the present day, the *Ponerinae* consisting of the most ancient and primitive forms of ants, dominant in Australia, being first; and the *Camponotinae*, which is the highest subfamily, last. Bondroit begins with his "*Dorylitae*," and then follow his "*Formicitae*," "*Poneritae*," "*Dolichoderitae*," and "*Myrmecitae*"; an arrangement without reason, or order!

We are also quite unable to follow his tables—a species which has already been separated off in a previous section, is again introduced into a subsequent part of the table; which surely contradicts itself.

Space will not allow us to deal at much greater length with the rest of the work, and before concluding only a few points here and there can be mentioned.

Bondroit uses the name *Formicina*, Shuckard, for the genus *Lasius*, F. (nec Jurine), and drops the subgenera—*Dendrolasius*, Ruzsky, *Chthonolasius*, Ruzsky, and *Donisthorpea*, Mor. and Durnt., altogether. We will not say much about this, since Emery, Forel, and Wheeler vary from each other in names they use for this genus and the subgenera; only that it seems to us when Wheeler in 1911 designated the type of *Formicina* as *Formica rufa*, L., it precluded any further use of the name *Formicina*.

Bondroit's new species and varieties of "*Formicina*" appear to us to be chiefly founded on ants from individual colonies of *flava*, and inetmediate forms between *umbrata* and *mixta* which come under Forel's *mixto-umbrata*; his *microgyna* seems to be nothing else than *bicornis*, Först. The differences given between *Cataglyphis cursor*, Fonsc., and *C. tibialis*, Bond, do not appear to us to be specific.

In the table on *Formica*—*picea* and *rufa* are said to be alpine or subalpine species; the former which is only found in sphagnum bogs, is not alpine at all, and the latter is widely distributed. Under the descriptions of each species, *F. picea* is said to nest in turf-pits ("tourbières"), and damp meadows; not exactly alpine localities. September is given for the appearance of the sexes; these however are found in July and August, and Bönner, who found the species abundant in sphagnum bogs at Lyngbymoer, distinctly states the sexes were never to be found in September. Bondroit named two deälated females taken by us in a large colony of *F. fusca* under stones in a field near Tenby as *F. picea*. This, and the above statements, appear to suggest that he does not know the species.

The nests of *F. glebaria* are said to be subterranean and scarcely visible from outside. As a matter of fact *glebaria* nests frequently consist of raised earth mounds, covered with low débris of cut grass, gorse, pebbles, or anything handy, which are very conspicuous. The sexes often occur before the middle of July, and not at the end of the summer.

No localities are given for *F. rufibarbis* and no mention is made of its interesting and rather distinct habits.

The *fusca* group has always presented considerable difficulties, and this is only enhanced by the creation of four new species (and one new variety) which do not appear to us to possess specific characters; moreover *F. fusca* var. *fusco-rufibarbis*, Forel, which is called "*Formica fusco-rufibarbis*," is retained, although ignored by both Emery in his Palæarctic species, and Wheeler in his revision of *Formica*. It has also been shown to be a synonym of *F. fusca* var. *rubescens*, Forel.

F. glebaria and *F. rubescens* are treated as species and are said to possess one or two hairs on the pronotum. We have examined hundreds of specimens of these two varieties of *F. fusca*, and we have never found them to possess hairs on the pronotum. *Formica piniphila*, Schenck, and *F. polyclena*, Först, which have long been sunk as synonyms of *F. rufa*, L., are reinstated. (When we first discovered *F. rufa* var. *alpina*, Santsehi, in Scotland, and sent specimens to Bondroit, he returned them as *F. piniphila*, Schenck!) They are at most forms of *F. rufa* var. *rufo-pratensis*, Forel, which is left out, and

which embraces the intermediate forms between *F. rufa* and *F. pratensis*.

Two new varieties—var. *grouvellei* of *F. rufa* and var. *cordieri* of *F. pratensis* are brought forward on female specimens only! It would be easy to go to any locality where large colonies of *F. rufa* occur, such as Weybridge for example, and take specimens from the different nests, or even from the same nest, and describe new species and varieties from the extreme forms, but no good to the study of ants, or indeed to entomology could arise from such a proceeding.

A new species near *F. exsecta*—*F. dalcqui*—is described, but its characters are differentiated from *F. exsecto-pressilabris*, Forel, which is itself a variety intermediate between *F. exsecta*, Nyl., and *F. pressilabris*, Nyl.!

The table for the genus *Myrmica* is quite incomprehensible to us, the same species appear several times under the different sections in the most bewildering manner—thus the new species (?) *rolandi* is first said to have the frontal area smooth and shining, and then finely striate! In the description it is given as sometimes a little shining and sometimes dull and striate. He compares it with *specioides*, another new species (?), which he has already pointed out is probably the *M. sabuleti*, Forel!

Under *M. rugulosoides*, Forel, and *M. sabuleti*, Meinert, he says that the former is the *sabuleti*, Forel, not Meinert; and that specimens he considered to be the latter, Emery said were *schlenkeri*, Emery; and leaves it at that!

M. sulcinodis in the description is correctly said to have the scape strongly bent at the base, whereas in the table it is said to be only slightly bent!

M. lobicornis, a variable species, is given as an alpine species only; though it occurs in Surrey and other lowland localities.

M. arduennae, Bondroit (of which he describes a new variety) is in our opinion only a form of *M. lobicornis*, Nyl., and *M. wesmali* a form of *M. scabrinodis*, Nyl. *Myrmecina kutteri*, Forel, is an aberration, not a "gynoidé," of *M. graninicola*, Latr.

The difficult genus *Leptothorax* is rendered still more complicated by the creation of no less than 10 new species and 4 new varieties!

A new variety of *L. nigriceps*, Mayr., is given as "var. *pyrenaeus*, n.var. (= *tuberosum*, Nyl.)," which is absurd. If the *tuberosum*, Nyl., is a variety of *nigriceps*, Mayr., which we do not admit for one minute, then it should be written *Leptothorax nigriceps*, Mayr., var. *tuberosum*, Nylander, and not with anyone's new fancy name.

L. cordieri, n.sp., is described from a single worker!, and its new variety *rougeti* from numerous specimens in the Museum at Brussels determined by Rouget as *L. tuberosum*. The probability is that both this so called new species and its variety are nothing but *L. tuberosum*, Nyl. Under *Messor* a variety of *M. structor*, Latr., is mentioned as "var. vel. sp.?", and is said to be the *M. sordidus*, Forel, and the *M. structor*, Emery (nec Latreille); and *M. bouvieri*, Bondroit, is written "*M. bouvieri*, nov. nom.—*capitatus*† auct. (nec Latr.)." Apparently all previous authors are wrong, and he fails to see why Emery should call it the *Formica capitata*, Latreille, which is common in the environs of Bordeaux.

It is with much regret that we have had to express such an

unfavourable opinion on Bondroit's work (for whom we have personally nothing but the most friendly feelings); but it appears to us to be absolutely necessary, in the interests of the study of ants, that such reckless creation of new species, and so many inaccurate statements, should not be allowed to be published without the strongest protest being recorded.

Zygæna loti, Wien. Verz., versus *Z. transalpina*, Esper.

By G. T. BETHUNE-BAKER, F.L.S., F.Z.S., F.E.S.

Zygæna loti, Wien, Verz.

Dr. Verity (*ante* p. 28 and 29) suggests that this name takes precedence over *Z. transalpina*, Esper.

I am unfortunately unable to understand from his remarks why he comes to this conclusion—he merely says it “certainly is the little Central European subspecies of the same species,” *viz.*, *transalpina*. This is his statement, but he does not tell us why he thinks so.

Now what is *loti* in reality? It was created by Schiffermüller in the *Vienna Catalogue*, was referred to by Hübner and again by Haworth, whose labelled specimen is now in the Tring Museum. There is little doubt, however, that Esper's figure, pl. 35, fig. 1, represents what he then considered to be *loti*, but other authors did not take his view. The species figured by Hübner, pl. xvii., fig. 82, is almost universally put down as *meliloti*. It is, however, quite different from Esper's figure, which is without doubt a six spot species.

Is it possible to consider that that figure represents any form of *transalpina*?

In my judgment I am quite convinced that it has nothing to do with Esper's species (*transalpina*). I have no doubt whatever that it is not *transalpina*. I have little doubt that it is *filipendulæ*, the shape of the insect and the hindwings point without any question to Linné's species and not to Esper's—it represents a small specimen of the form in which each pair of spots is confluent, *viz.*, *cytisi*, Hb., and I have a specimen almost as small and just like it. Dr. Verity himself, in the paper I am discussing, gives us “an unmistakable character, . . . no matter how similar to each other they may be,” *viz.*, the position of the hind pair of spots which, he says, “in *transalpina* are always situated more outwardly, and a line drawn parallel to the body through these spots,” that is I suppose *between* them, “does not pass through them, but in *filipendulæ* it does pass through the outer spot.”

This character settles the point at once, for regardless of the fact that the two spots are confluent in *loti*, Esper, their position is certainly that of *filipendulæ* and not of *transalpina*. Again the hindwings, not only as to their margins, but taking into consideration the whole wing, are those of *filipendulæ*, not of *transalpina*. It is over thirty years ago since I took my first *alpina* specimen of *transalpina* and also my first Piedmontese specimen, and it had from the beginning a fascination for me, so that I have always paid it extra attention, and I regret that I cannot possibly accept Dr. Verity's proposal.

In his last *Catalog*, 1901, Staudinger refers Esper's *loti* to *astragali*, Bkh., but the figure does not suit Borkhausen's description. In the

same *Catalog* Staudinger refers *loti*, Hb., to *meliloti*, but in as much as Hübner himself at p. 118 of the *Verzeichniss* puts *achilleae*, Esper, as a synonym of *loti*, it is evident that both references cannot be right.

Let us, however, turn to some of the old authors. Fabricius (*Ent. Syst.* p. 387) calls it *loti*, Wien. Verz., and he places as synonyms *fulvia*, (*Mant. Ins.*), and *loniceræ*, Esper's plate 24, fig. 1. He does not however refer at all to Esper's plate 35.

Haworth's *loti* is a five spot species and his type (if I may call it so) is now in the Tring Museum.

Stephens also considered *loti* to be a five spot species, which he placed after *trifolii*, Esp., and described it as considerably larger than that species, while his diagnosis is an excellent one of *loniceræ*.

Samouelle in his Calendar calls it the five spotted Burnet and quotes Haworth.

Stephens in his systematic catalogue revises his illustrated work, for at p. 29, vol. ii., he refers the *loti* of Hübner to *meliloti*; under his No. 5903 he gives *loti* as a species, referring to it the records of Fabricius, Haworth, Stephen's Ill., Donovan, and Esper's plate 24 in vol. ii., figs. 1, *a* and *b*, which latter Esper called *loniceræ*.

On the same page he, Stephens, gives *hippocrepidis* as his next species and under it gives *loti*, Esper, pl. 35, fig. 1, as a synonym.

Herrieh-Schäffer in vol. ii., p. 37, quotes *loti* as a synonym of *angelicæ*.

It seems almost needless to go further. We evidently have two species under the name *loti*. The original of the Vienna catalogue and of Hübner seems to me to be correctly referred to *meliloti*, whilst that of Esper is certainly something different and after comparing all that I can find on this species I feel sure we shall be right in referring it to *filipendulæ* form *cytisi*, and as I said previously I have a specimen from which the figure might almost have been taken.

In the same paper Dr. Verity (p. 29) proposes to supersede *transalpina* var. *alpina*, Boisd., by *alpicola*, Verity, but by so doing he is creating a pure synonym, for it is quite valid to have *Zygaena filipendulæ*, race *alpina*, and *Zygaena transalpina*, race *alpina*. The two insects are two quite distinct species and therefore the name *alpina* can be correctly used as a sub-species of each. It may be, however, that Dr. Verity considers *transalpina* is merely a form of *filipendulæ*; as I believe he does with *loniceræ* and *trifolii*, but in this case I come into direct conflict with his conclusions, for the genitalia prove quite conclusively that they are not the same species, the tegumen is very different in shape and structure, whilst the armature of the ædoæagus is also markedly diverse.

In another case, that of *transalpina* ab. *zickerti*, Hoffman, Dr. Verity apparently proposes to sink the name *zickerti* to his *latina*.

He says "most specimens thus belong to the yellow *calabrica*, called *zickerti* by Hoffman, but I think that to use the name of a single very special form for such a variable race would only lead to confusion, and both Querci and I have agreed to give it a geographical name."

If, as I understand from this paragraph, *zickerti* is the same form as *latina*, and if, as I also understand from the same paragraph (for I have been unable to trace any reference to Hoffman's name; it is not

in Staudinger's last *Catalog*, nor yet can I find any reference to it in the *Zoological Record* from 1901 till now) *zickerti* has priority over *latina*, this proposal is absolutely contrary to the Code and cannot be followed; whilst apart from the Code it is obvious that such a proceeding will lead to endless confusion, if insects are distributed to friends and others as *latina*, when they really are *zickerti*.

I understand *zickerti*, from my correspondence with Querci, to be the beautiful dominant small yellow race, and from Verity's whole paragraph, *ante* p. 41, I understand his *latina* to include the red, the pink, and the yellow forms; it is therefore self evident that it is much more convenient to call the yellow form *zickerti* than to have to say the yellow race of *latina*, and this quite apart from the question of priority.

P.S.—Since writing my note on *Zygæna loti* I have had to turn up some references to Oechsenheimer's second volume, and I find that he had no doubt as to what was understood in those early days by *loti*, for he places it, referring to figures, quite definitely to Hübner's *hippocrepidis*, and he likewise refers Esper's figure 1, plate 35, to the same species, whilst in an addendum at the end of his description he most carefully goes into a comparison of Esper's *transalpina* and *loti*, and he comes to an emphatic conclusion that *transalpina* does not belong here, *i.e.*, to *hippocrepidis*, of which he makes *loti* a synonym.

Also since writing the above I have looked up Seitz and find that he says *zickerti*, Hoffm., "is similar to *boisduvalii*, but the hindwing is all black, being without the yellow central spot," but in the *Ent. Zeit. Int. Ent. ver.*, xviii. (1904), p. 9. Hoffman says "Vorderflügel mit 5 kleinen gelben Flecken, Hinterflügel ganz schwarz oder nur mit einem kleinen gelben Fleck." Mr. Turner has kindly sent me this extract taken from Dziurzynski's *Synopsis* in the *Berliner Ent. Ver.*, 1908, as I do not possess the serial quoted, and it seems not improbable that *boisduvalii*, Costa, and *zickerti*, Hoff., may possibly prove to be the same insect, as Costa's insect came from Naples and Hoffman's variety is said to occur "in Mittel und Süd-Italien," so that it seems to me probable that both may be the yellow form of the large race of *transalpina*. This, however, does not affect the principle for which I am contending, that it is quite inadmissible for one author to sink the name of an earlier writer and create another name to take its place, merely on the plea of its being "a very special form."

The Swiss species of the Genus *Hesperia*.

By B. C. S. WARREN, F.E.S.

(Continued from page 52.)

H. ryffelenensis, Obth.

It is still doubtful whether it is correct to treat this insect as a distinct species, but the opinion of those most competent to judge seems to incline that way, and I can add one biological item of interest, hitherto unrecorded, which appears to be a further reason for doing so. I have only once taken *ryffelenensis*, and on that occasion only two specimens; a ♂ and ♀ paired, in perfect condition, doubtless emerged that day. Unfortunately shortly afterwards I missed two other specimens. The locality was the Alp Scharmoin on the western slopes of the Parpaner Rothorn in the Grisons; the date

August 8th. This record is of particular interest for two reasons; it is the first occasion on which the species has been recorded from Eastern Switzerland; and it is the lowest altitude at which the species is as yet known. I captured it in the open fir forest on the lower slopes of the Alp, at (as near as I can ascertain) an altitude of 5800 ft. I had visited this spot seven days before and had not seen any sign of this miniature *alveus*; so, having regard to their perfect condition, I feel sure that the species was only just beginning to emerge. Much to my regret, I could not visit the locality again. At first sight, perhaps it seems that this capture of *ryffelensis* at so low a level, points to its being a var. of *alveus*; but I think it can be shown that this is not the case. I do not know what the extreme limit of altitude reached by *alveus* in the Alps is, but in my personal experience the highest point at which I have found *alveus* was on the Gemmi Pass, where it ascended to something over 6300 ft. Now we have already noted that even at considerable altitudes, *alveus* emerges but little later than it does lower down; and at the height mentioned on the Gemmi it commenced to emerge between July 6th and 12th. The usual time of emergence for *ryffelensis* is, I understand, the end of July, that is at levels as a rule over 7000 ft. It would be quite natural to suppose that if *ryffelensis* occurred lower down, it would appear correspondingly earlier. But, as already noted, at 5800 ft. I found it just emerging on August 8th. This altitude is 500 ft. below that to which I know *alveus* to rise, at the same time maintaining its normal habit of emergence; while it is certainly 1300 ft. lower than the hitherto known haunts of *ryffelensis*, and yet that latter holds to its own, somewhat remarkable, time of emergence; for *andromedae* and *cacaliae* at great altitudes emerge a month or more earlier. (I took *cacaliae* the same season and district, at over 7000 ft. on June 18th.) It seems to me then, that if *ryffelensis* was a form of *alveus*, when it occurred in the *alveus* zone it would certainly commence to emerge at the same period as the latter; but, even allowing a week for a retarded season, we see that *alveus* commences to emerge, 500 ft. higher, a full three weeks in advance of *ryffelensis*. As long as *ryffelensis* was only known at altitudes over 7000 ft., dates gave but little to work on that might not be supposed to be accounted for by the differences of level between the two species; but in the present circumstances it is different. Further, those who maintain *ryffelensis* to be an alpine race of *alveus*, can no longer attribute its diminished size and markings to be due to its elevated habitat, for it maintains these unchanged in the zone of typical *alveus*; and though really small *alveus* do occur with the type, they are in my experience extremely rare, and never so small as *ryffelensis*. The above facts, I think, go near to supplying the missing quantity in the proofs required to separate these two insects.

Of the variation of *ryffelensis* I cannot say anything. The pair I possess are just a little smaller than normal *armoricanus*, but the white markings on both sides of the wings are much finer than the corresponding ones in that species. This will give an idea of the great difference in the size of these markings between *ryffelensis* and *alveus*. The fringes of my ♂ specimen are very dark, almost shaded over altogether; but I cannot say if this is a constant feature of the species, or whether it produces any aberrations of the *extensa* form. I expect these do occur, as in every other species of the A. group.

H. armoricanus, Obth.

It is not many years since this species was separated from *alveus*, and so was rescued from the oblivion of that all-embracing phrase, which has gradually become (metaphorically speaking) a sort of asylum for unidentified *Hesperias*, "some form of *alveus*." *Armoricanus* probably deserved the fate more than the majority of other species that met with it; for in its typical form it resembles *alveus* to a certain extent; but on occasions it also resembles one or two other species somewhat closely, principally *onopordi*, *fritillum*, and *carlinae*. Despite this I have never found a specimen of *armoricanus* which I could not identify superficially. The species (at any rate in Switzerland) cannot be considered so variable as *alveus*; but all the same it shows a considerable tendency to transitional variation, which causes individual specimens to assume a likeness to one or other of those species already mentioned. The coloration of the underside of the hindwing is the most variable feature; indeed in this respect it varies more than any other species of the genus. *Armoricanus* is known to occur in various parts of Switzerland, but I have only taken it at Branson and Follaterre in the Rhone Valley. From these localities, however, I have a long series; which I think gives a fairly complete idea of the normal range of its variation. The var. *extensa* is more often met with in this species than any other, and is responsible for the most confusing forms, which are always a good imitation of *onopordi*. In its various habitats at Branson and Follaterre (and other localities in the Rhone Valley too) *armoricanus* is found in company with *onopordi*; hence, any *extensa* form will be the more likely to get identified as the latter. The ground colour of the hindwing underside is normally much yellower in *armoricanus* than *onopordi*; but the former in this respect varies endlessly, and one not infrequently sees specimens exactly similar to *onopordi*. A specimen showing this combination of variation (colour and shape of markings) requires careful examination to prevent mistakes, but still can always be identified without recourse to the genitalia. In *onopordi* the anvil-shaped central spot of the median band projects in a very characteristic way, both towards the hind margin as well as towards the base of the wing, and both it and the hooked spot next the inner margin are bordered by a very fine sharply marked black line, most striking in fresh specimens and still fairly visible in worn ones. These lines are never found in *armoricanus*; the projection from the central spot is never the true *onopordi* shape; and thirdly, the spot on the inner margin is never similar to that specialised feature of *onopordi*.

Of the other aberrations, we get examples which are slightly suggestive of *carlinae*, particularly so in the beautiful coloration of the underside; but this form can never cause trouble, if the collector has taken care to label his captures accurately, *armoricanus* being quite a lowland species. The *fritillum*-like form too is an interesting one, which might easily get recorded as *fritillum*. That this has happened in the past on more than one occasion is shown by the var. *cirsii*, Rmbr., recorded from Salquenen and Martigny by Favre and Wulschlegel respectively (*Butts. of Switz.*, p. 4, Wheeler) which almost certainly can only have been this aberration of *armoricanus*. This

particular aberration is a little larger than the type, the ground colour underside hindwing is of the fine reddish tone characteristic of *fritillum*, and the nervures of the same colour stand out very conspicuously. In these three respects then, size, coloration, and prominent nervures, this aberration is remarkably like *fritillum*, but the white markings on the upperside will always enable it to be identified. The white spots on the forewing of *armoricanus*, although sometimes a little enlarged, never approach the heavy square markings of *fritillum*, and the intradiscoidal spot, although rarely rectilinear, never assumes the solid proportions of the well known "signe de Delahaye." Further, the amount of white on the hindwing is rarely (if ever) developed to the extent it is in *fritillum*. The latter is also a squarer insect in build. This form can be found in both broods of *armoricanus*; but, of course, it will only be in the case of those examples taken in the second brood that any question as to their identity can arise.

The general likeness between the type forms of *armoricanus* and *alveus* has been already commented on. The two species occur together at Follaterre. With a series of each side by side, they are separable at a glance; but if a single specimen of either is taken it is not so easy. The date, when considered in connection with the condition of the specimen, is, however, an excellent means of identification. The second brood of *armoricanus* appears in late August and September; the earliest date on which I have taken it being August 20th, and by this date *alveus* is very nearly over. I have taken both species together on August 22nd, *armoricanus* in numbers and quite fresh, and a few worn *alveus*, which made a quite unmistakable contrast. Occasionally, a retarded specimen of *alveus* will be met with in very fine condition; and in such cases the collector (unless he employs the genitalia) will have to depend on the characters previously mentioned. In one respect, size, the difference is much more marked than one would be led to suppose by a comparison of measurements of a series of each species. If a specimen of *alveus* is seen on the wing among a number of *armoricanus* it immediately catches the eye as being something different. I have thus on several occasions picked out an *alveus* while it was flying among a number of *armoricanus*. I am inclined to say that nine times out of ten size alone will be sufficient to determine the species; for Nature in this instance comes to the help of the collector. It is a well known fact, that in many species of butterflies that are double-brooded, the individuals of the first brood are larger than those of the second; and although there is no constant difference in size between the individuals of the two broods of *armoricanus*, yet there is a strong tendency to an increase in size (aberrationally) in the first brood. Such specimens, although still quite characteristic of *armoricanus*, might in the second brood be difficult to separate from *alveus*; but, occurring with the first, there is hardly any question as to their identity. Further, as already noted, a small specimen of *alveus* is an extreme rarity.

Before leaving the subject of the distinguishing features of *armoricanus* and *alveus*, it must be noted that the prominence or otherwise of the nervures, on the underside of the hindwing, which is supposed to be a valuable character, is quite unreliable; these nervures often being as pronounced in *alveus* as in any example of *armoricanus*.

Dr. Verity finds a difference between the individuals of the two broods of *armoricanus* in Italy, which he considers of sufficient importance to merit a separate name. Among the Rhone Valley specimens I cannot detect this. If my specimens were mixed it would be impossible to separate them again, except by their labels. The species, which is very abundant at Branson and Follatterre, is equally well represented in both broods. I once took a specimen at Vernayaz, which must have strayed there from elsewhere, as I never saw another.

H. carlinae, Rbr.

I have only had the pleasure of taking this species once; not that it is by any means rare in the Valais or Bernese Oberland, but principally because of its late period of emergence. Its time of flight is, normally, August, and this is the more remarkable as it is apparently confined to altitudes between 4,000 and 6,500 feet. Where I found it, in the Ueschinen Tal, above (and at) Kandersteg, it commenced to emerge on July 20th. This was at the lowest altitude from which I have seen the species recorded, *i.e.*, 3,800 ft. to 4,800 ft.

The species varies on the usual lines. The *extensa* forms are not very rare, and are sometimes very finely developed, while examples showing a slight tendency to this variation are of very frequent occurrence. These aberrations, owing to the size of the species and beautiful coloration of the hindwing underside, are very like *onopordi*; and if this latter species turns out to be an inhabitant of a wider area in the mountains than is at present known, will give trouble to collectors who take both, and are not really familiar with each species. From what is known, however, it is probable that *onopordi* will be over, or nearly so, before *carlinae* emerges. The method of examination of the genitalia, already described, is very applicable in this case, for the specialised formation of the valvæ and scaphium (or what used to be called the scaphium) in *onopordi* differs so completely from these structures as found in *carlinae* (or indeed any other *Hesperia*) that they can be distinguished at a glance. Superficially it will not be so easy, the difference being very slight, but, at the same time they are perfectly constant, and can be relied upon to give an absolutely correct identification. The fine black lines which border the spots of the median band in *onopordi* are never present in *carlinae*; in this latter the white markings on the hindwing underside are outlined by the ground colour, and the spot next the inner margin is never of the characteristic shape which in *onopordi* has earned it the name of the "signe de Blachier." Lastly, in *carlinae*, the somewhat elongated spot, which projects from the outer margin of the wing, and is with the exception of the spot at the anal angle, the only trace of the marginal band to be seen in this species, forms a very readily recognized feature.

There is a strong tendency in *carlinae* to a reduction of the white markings on the underside, always, however, without these markings becoming obsolete. A specimen in my possession has all the white reduced to nearly half its normal extent, the formation of the markings remaining unaltered. In any other species of the genus, such a reduction is usually accompanied by the loss of a part of the markings.

Carlinae may be said, on the whole, to be one of the most easily

identified species in the genus. This is partly because the fine colour of the underside of the hindwing is not at all variable. The two species which approach *carlinae* nearest in this respect are *fritillum* and *armoricanus*; but neither of these occur at all in Alpine regions.

(To be concluded.)

NOTES ON COLLECTING, Etc.

ZYGAENA PUPATION.—I have to record a curious collection of sites for pupating that I met with at Malvern last year. Whilst taking a walk one day I saw several cocoons attached to some barbed wire fencing, and they became so numerous that I counted them. The wire fencing was the boundary to a considerable pasture for cattle alongside one of the roads, and the grass had grown quite long the whole way underneath the barbed wire, so that the larvæ had evidently crawled up the grass stems on to the wire. The cocoons were placed both horizontally and vertically. In a distance of perhaps a couple of hundred yards, or somewhat more, I counted about one hundred and forty cocoons on the wire compared with twenty-five on the stems of the grass. The latter was evidently of very mature growth, so that it was not for lack of suitable positions that this curious selection was made.—G. T. BETHUNE-BAKER.

“A LITTLE KNOWLEDGE IS A DANGEROUS THING.”—Another wonderful example of “Newspaper Entomology” from the *Daily Chronicle*, which you may like to print in next convenient *Record*. “The First ‘Peacock’?” Walking in Devonshire this afternoon (February 18), writes a correspondent, I saw *flying low and falteringly* what I first thought was a Wood Argus butterfly. It alighted on a twig on a bank, and as it clung to it, *slowly raised and spread its wings* in the warm February sun. As I looked I saw that the insect was a *freshly emerged* “Peacock.” The colours deepened, the *dark brown* dried to a *warm copper*, and the *white* wings became clearer. After watching it for ten minutes I left it, with wings flat and perfect and *apparently quite dry*. I never before saw a butterfly of this species with such brilliant colours or more definite markings.” There was a subsequent letter giving more or less concise details of *io*’s life history, but not correcting any of the above howlers.—C. NICHOLSON, 35, The Avenue, Hale End, Chingford, E. 4.

CURRENT NOTES AND SHORT NOTICES.

“THE STEALING OF THE COMMON FROM THE GOOSE” AGAIN.—We hear that there is to be a Bill introduced into Parliament with the object of securing the enclosure of portions of Wanstead Flats and Epping Forest for the purpose of permanent allotments. This attempt if successful will completely nullify the Act of 1878 when these areas were supposed to be secured to the public for ever. Will all help against this proposed misappropriation. The Essex Field Club, The Entomological Society of London, The South London Entomological and Natural History Society, etc., are sending strong resolutions against this proposal to the Prime Minister, the London Members of Parliament and the City Corporation (the Conservators of the Forest).—Hy.J.T.

The *Rev. Mens. Namur.* for December and January contains descriptions of the following new aberrations from M. C. Cabeau.—(1) *Melitaea aurinia* ab. *semifuscata* in which the upperside of the forewings is covered by brownish to such an extent that all the yellowish spots have disappeared and the markings are for the most part obscured. (2) *M. cinxia* ab. *leucophana* in which the ground of the forewings is white lightly suffused with yellowish, that of the posterior wings a whitish fawn. (3) *Pararge megera* ab. *transfusca*, in which the two median bands of the forewings on the upperside are united by deep brown coloration into a wide and irregular band. This has already been named ab. *mediolugens* by Fuchs, and there seems no reason to rename what is already christened simply because it happens to occur in a new locality. That Seitz in his *Mac. Lep. Erde* has localised it on the Rhine seems but a weak argument to rename a form which is met with here and there throughout the range of the species. It is occasionally met with in Britain.

In the *Canad. Ent.* for January the Popular and Practical monthly article deals with "Cottonwood Leaf-mining Beetles in Southern Alberta," chiefly referring to the attacks on the various species of poplar by *Zeugophora scutellaris* and *Z. abnormis*. The controls are (1) A Mymarid (Hym.) which stung a large percentage of the eggs of the beetle and (2) the spraying of infested trees with Lead Arsenate or Paris Green. It is suggested that the spraying should take place early and that the majority of the trees of the district should be treated, thus poisoning most of the beetles while they were feeding before oviposition.

It is a pity that the writer of the Notes in that excellent magazine the *Naturalist* should amuse himself by making invidious remarks upon contemporary magazines, including the *Ent. Record*. The February number contains some very ungenerous remarks upon us, which induced a few enquiries. But as we were seriously informed that the writer "can't help it," we leave it at that. "He can't help it." Poor man.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

February 12th, 1920.—NEW MEMBERS.—Mr. Withycombe, of Walthamstow, and Capt. Crocker, of Bexley, were elected members.

EXHIBITION OF THE GENUS *HIBERNIA* AND ITS VARIATION.—The Rev. F. M. B. Carr introduced the discussion and exhibition. Messrs. A. W. Buckstone, R. Adkin, A. E. Tonge, H. E. Leeds, B. S. Williams, S. Edwards and Hy. J. Turner exhibited the various species and joined in the discussion. Mr. R. T. Bowman especially dealt with *H. defoliaria* as it occurs in Epping Forest.

ABERRATIONS OF BRITISH LEPIDOPTERA.—Mr. Newman, a box of aberrations from the Sydney Webb collection, including remarkable specimens of *Arctia caja*, *Hipocrita jacobaeae*, etc. It was reported that *Phigalia pendaria* was out full near Huddersfield on Jan. 17th and one specimen as early as Dec. 4th, 1919.

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Desiderata.—Foreign examples, local races, vars. and abs. from all parts of the world of any butterflies included in the British list. Setting material; exact data indispensable. Liberal return made.—W. G. Pether, "Thelma," 4, Willow Bridge Road, London, N. 1.

Duplicates (all Clydesdale).—*Ethiops*, *Selene*, *Icarus*, *Phleas*, *Hectus*, *Mundana*, *Perla*, *Fulva*, *Nictitans*, *Tritici*, *Chi*, *Boreata*, *Cambrica*, *Belgiana*, *Immanata*, *Olivata*, *Tristata*, *Boreata*, *Mercurella*, *Angustea*, *Dubitalis*, *Ambigua*, *Truncicolella*, *Derepitalis*, *Kuhmella*, *Fusca*, *Margaritellus*, *Hortuella*, *Hyemana*, *Phryganella*, *Ferrugana*, *Solan-drinana*, *Sponsana*, *Conwayana*, *Stramineana*, *Rivulana*, *Urticana*, *Oclomaculana*, *Perlepidana*, *Vaccinana*, *Geminana*, *Herbosana*, *Mylleraana*. *Desiderata*.—Numerous.—A. A. Dalglish, 7, Keir Street, Glasgow.

Duplicates.—*Phigalia pedaria*, *melanic* and intermediate forms in great variety.

Desiderata.—Numerous common species.—M. Corbett, 3, Thorne Road, Doncaster.

Mr. Donisthorpe will still be glad to receive ants and Myrmecophiles from all parts of the British Isles, and to name any such for anyone who is kind enough to send them to him. He would however suggest that ants from any other parts of the world be sent to his colleague, Mr. W. C. Crawley, 29, Holland Park Road, W. 14. Mr. Crawley is specialising on the ants of the world, and it is a matter for congratulation that we should possess an Entomologist in this country whose whole attention should be concentrated on this branch of Entomology.

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m.—1920, May 5th; June 2nd; October 6th and 20th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E. 3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society).—Hall 20, Salisbury House Finsbury Circus, E.C. The First and Third Tuesday in the month, at 7 p.m. Visitors invited. Hon. Sec., J. Ross, 18, Queens Grove Road, Chingford, N.E.

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The Swiss species of the Genus *Hesperia*.

By B. C. S. WARREN, F.E.S.

(Continued from page 83.)

H. fritillum, Schiff. (*cirsii*, Rbr.)

There are, among the Swiss *Hesperias*, but two species which are confined entirely to the plains, *armoricanus* and *fritillum*. Of these the former is double brooded, but *fritillum* is not. In spite of this, it is seldom to be found on the wing before the first days of August, and in backward seasons it frequently does not appear before the middle of the month. I have never seen a specimen from the Valais, and have so far only taken it in its well known locality of Éclépens, where it is abundant all along the hill side above the marsh. All the grass on these slopes is burnt brown by the middle of August, it being only in certain hollows and places sheltered by the undergrowth and trees that any vegetation is left. These places are the most frequented by such butterflies as are still about, but *fritillum* is only a very occasional visitor to them. So much so is this the case that the first season I worked the locality for *fritillum* I only got three specimens and came to the conclusion that its headquarters must be elsewhere. The fact is, however, that *fritillum* prefers the more arid spots. Any place on the hillside where the vegetation is completely burnt up there one will surely find *fritillum*, and though one seldom sees more than one or two specimens simultaneously, a half hour spent on one of these barren stretches will produce a fair number. Almost all the specimens thus captured will be ♂s, the ♀, most likely, hides among the long withered grass, and so is very difficult to find.

Fritillum is an easily recognised species; the heavy square white markings, and the broad and straight-edged intra-discal spot on the upperside of the forewings, the broad white band on the upperside of the hindwings, the deep coloration and prominent nervures of the underside, all combine to make the species unmistakeable. It is never likely to be mistaken for any other species, being, in my experience, one of the least variable species of the group. The amount of white on the upperside shows some tendency to vary, and the basal spots on the underside of the hindwing are liable to a certain amount of variation too; as one, not unfrequently, finds specimens in which they are somewhat reduced in size. Such examples, if the rest of the white markings on the underside are also slightly reduced, have a certain resemblance to an aberration of *malvae* or *malvoides*, in which the white markings are enlarged. I do not think that a careful observer could be led into the error of identifying such an aberration as anything but *fritillum*; but the converse might quite possibly happen. This aberration will be mentioned again, in connection with *malvoides*.

The var. *extensa* is but poorly represented by the specimens from Éclépens, being both rare, and seldom, if at all, of a pronounced formation. Still, as I am only acquainted with the species in one locality, it is quite possible that in others it may be less rare, and more developed.

H. serratulae, Rbr.

In Switzerland, *serratulae* develops two distinct forms, which have been called the plain and mountain races; though neither form is by any means confined to either the plains or the mountains. Still, the

Max, 1920.

terms are convenient; so we continue to call the form most prevalent in the lowlands the "plain form"; even if we happen to find it, as I have done, at an altitude of over 6,000 ft.!

The differences between these two forms are too well known to need description. So far, in the lowlands, I have only come across *serratulae* once, at Éclépens; but it is known to occur in many other similar localities. I have seen one somewhat interesting note on the occurrence of *serratulae* at Branson. The late Mr. J. Alderson, in an account of a butterfly hunt in the Rhone Valley in 1910, recorded the capture of *serratulae* at Branson, on May 18th (*Ent. Rec.*, vol. xxi., p. 185). In spite of frequent visits to that locality in May and June, during several consecutive seasons, I have never found *serratulae* there; indeed, until I saw Mr. Alderson's record, I felt sure that it did not occur there. Now, anybody who reads Mr. Alderson's paper will notice at once that he gave more attention to the *Hesperias* than was usual; therefore, I should have had no doubt that his identification was correct, and concluded that I had somehow missed the species; only the late Canon Favre records *serratulae* from Branson too (Wheeler, *Butts. of Switz.*), and gives the date July and August. This is quite impossible, and shows that Favre's specimens were not *serratulae*; for in a locality such as Branson, June 15th would be a very late date for the species, and it is not double-brooded. Mr. Wheeler's book is in general use among English collectors, and one wonders if Mr. Alderson, having, possibly, some difficulty in identifying his captures of *Hesperias*, was not influenced by Favre's record. It would be interesting to know if *serratulae* has ever been taken at Branson, or anywhere in the plain of the Rhone Valley; possibly it has; but I feel more than doubtful, and cannot help thinking of *armoricanus*.

Serratulae seems to have been chiefly regarded as a mountain species in the past; Kirby records it as inhabiting hilly and mountainous districts; and Kane says it is not found in the lowlands of Switzerland. We may conclude from this that it is much more widely distributed in the mountains; but where it does occur in the plains it is quite abundant.

At Éclépens it appears about the middle of May, but seldom lasts more than three or four weeks; specimens taken in the beginning of June are usually not worth keeping.

In the Alps I have found the species very common in the neighbourhood of Indersteg, on the Gemmi Pass, and near Lenzerheide (Grisons), and less abundantly in many other localities. It shows a considerable range of variation, but seldom in a way which would be likely to obscure the identity of the specimen. Among the large number I have taken I find only one which would be at all troublesome. In this specimen, the basal spots on the underside of the hindwing are not of the formation characteristic of *serratulae* (i.e., more or less separated and rounded), but are practically united, and square in shape; giving the insect a decided look of *alveus*. The other markings of the hindwing are, however, typical, therefore it was still possible to identify it without reference to the genitalia. (The latter were examined afterwards.) The median band of the underside hindwing is much less broad and more disconnected in *serratulae* than in *alveus*; also, the former is, as a rule, a much smaller insect. In the plains of course there would be no question, as *serratulae* is over before *alveus* emerges;

but in the mountains they overlap. In the latter case, if any number are taken, the condition of the specimens will be helpful.

Another form of variation in the basal spots is not uncommon. These spots are normally three in number, but the centre one shows a strong tendency to decline in size, and is, not unfrequently, absent. The two remaining ones, however, retain a perfectly typical appearance. Yet another variety of these spots is occasionally observed. The costal one is much elongated, projecting towards the median band, always, however, being rounded at the two extremities; there is also an increase in width in the median band, so that the spot is nearly united to it. In the extreme form of this aberration, the costal spot and the median band are joined, the spot diminishing in width towards the point of junction; the upper, or basal end of the spot, being still rounded. This extreme form is very rare, I have only seen the one example in my own collection; the transitional form, however, is more frequently met with. Any form of the var. *extensa* is rare in *serratulae*. Out of the large number of the species I have taken or examined, from a variety of widely separated localities, I have only found a few specimens showing a tendency to this form of variation; and in most instances the projection from the central spot of the of the band is very slight, just sufficient to break the even edge of the typical formation; but in a few cases it is strongly developed. It is interesting to note, however, that the tendency to produce these aberrations does exist in *serratulae*, although to a less pronounced degree than in any other species.

Of varieties of the upperside the ab. *caeca* is the most striking, and transitional specimens, with the white spots very much reduced but still present, are not uncommon, particularly among the ♀s. I have taken both sexes, however, quite without markings. The ab. *tarsoides* I have not seen, but specimens with enlarged white markings occur both in the plains and mountains.

GROUP B.

H. carthami, Hb.

Carthami is found more frequently in sub-alpine regions than in the plains. It can be taken at moderate heights throughout the Valaisian Alps, but seems not to occur in the Canton Vaud. In the lowlands I have only taken it in the Rhone Valley (Martigny district). It is, without doubt, the best known species of the genus; yet, on looking it up in various works, I was surprised to find the greatest divergence of opinion as to whether it is double- or single-brooded. According to the late Canon Favre it is double-brooded in the Rhone Valley, occurring there in April and May, and again in July and August (Wheeler, *Butts. Switz.*). Mr. Wheeler adds, however, that he has taken it at Follaterre, quite fresh, on June 12th. Kane (*Europ. Butts.*) records it as double-brooded, flying in May and June, and July and August, and adds, "earlier brood smaller and browner than the second"; while Mabille (Seitz, *Macro-lepidop. of the World*) notes it in May and June, and again from July until the autumn. Kirby (*Butts. of Europe*) states that it flies from May to August, implying one extended brood; which from my own observations I am sure is the correct solution. Favre's dates are probably the extremes he noted in

a great number of years. April, in my experience would be a most unusually early (? possible) date for *carthami*. Possibly it applied to a single early specimen, captured several weeks before the real emergence of the species; and, as for August, only the last ♀s survive to that month, except in very late seasons. Kane's date, May to August, is more normal, but his note about the size and coloration of the "earlier brood" is, to me, quite incomprehensible. The earliest specimens, so far as Swiss ones are concerned, are very fine and large and heavily dusted with grey. The ♀s are, of course, always somewhat browner than the ♂s, but they never emerge as early as the latter; nor do the ♂s ever produce anything that could be called a brown form, excepting when very worn. Even in localities where a small race of *carthami* is found (not in Switzerland) I have never noted a tendency among the ♂s to lose their normal greyish-black colour. Mabille's dates, if the result of personal observation, and not just a repetition of previously published records, must be founded on the capture of fresh specimens in the May, June, and July of separate seasons. Kirby's date concurs with the emergence of the species in the Rhone Valley. The earliest record I have is a single ♂ captured at Branson, on May 18th. As a rule I have found the ♂s appear during the last ten days of May, only once have I seen a ♀ in that month; these latter usually emerge in early June, and are seldom abundant before the middle of the month. At that date the ♂s are still in excellent condition, and occasional freshly emerged specimens still to be had. By the end of June both sexes are getting worn. Throughout July they continue in diminishing numbers; until at the end of the month the ♂s are only represented by a few very worn examples, though then usually a fair number of ♀s are left. Amongst these latter one can generally pick up a few in moderately good condition, but they are obviously not freshly emerged. The ♀s continue into August, but in a week or fortnight they have usually disappeared. One very late season I took two ♀s on August 22nd, but they were so worn as to be scarcely recognisable. These dates show the ordinary emergence and duration of the species in the Rhone Valley, where it is, beyond doubt, single brooded. The period of flight is probably longer than in any other species of *Hesperia*, which has doubtless given rise to theory of two broods existing. Further, it is worth noting, that the species of *Hesperia* which are double-brooded, occur regularly much earlier and later (i.e., in April and September) than *carthami*, and there is an appreciable time between their broods when one cannot find a single specimen.

All through the Canton Valais one finds a very fine form of *carthami*, equally large at all levels; considerably larger than specimens from more southerly localities, such as Digne, and close on twice the size of *carthami* from the Pyrenees, where the smallest race of the species, I know of, occurs.

In variation *carthami* offers little of interest, being quite the most constant species of *Hesperia*. The var. *reducta* occurs not uncommonly, but it makes very little difference in the look of the specimen, even when the inner edge of the median band is perfectly straight; and apart from this there is little variation worth mentioning.

(To be continued.)

Notes and Observations on the Lepidoptera of the Witley District from 1912 to 1919.

By AUSTIN A. TULLETT, F.E.S.

(Continued from page 58.)

Mitochondria miniata, Forst.—Eight, Witley, July, 1912. One, Witley, labelled 7th/10, possibly 10/7.

Cybosia mesomella, L.—Four, Witley, June, 1912.

Lithosia griseola, Hb.—Three, Witley, July 25th, 1912.

Lithosia lurideola, Zk.—Fourteen, Witley, July, 1912.

Lithosia complana, L.—Six, Witley, July, 1912.

Lithosia sororcula, Hufn.—One May and one in June, 1912, Witley.

NOCTUIDÆ.—Sub-family *Acronyctiinae*.

Demas coryli, L.—Larva found near Hambledon and Chiddingfold, June, 1919.

Acronycta leporina, L.—One, June 20th, 1918. One, June 13th, 1919, on tree trunk in The "Hill" Woods.

Acronycta alni, L.—Two larvæ taken at Witley early August, 1919, one on willow at Witley Park, one on willow (♂) near Chiddingfold. Pupated in tin box, and made a slight cocoon. Ignored raspberry cane placed in the box.

Acronycta tridens, Schiff.—Three, Witley, June 1st, 1913. One, July 9th, 1914. One, May 20th, 1912. Larva not observed.

Acronycta psi, L.—Moth not uncommon on fences in June and July. Larva not observed.

Craniophora ligustri, F.—One, July 18th, 1919, Witley. Not common.

Bryophila perla, F.—Eleven, Witley, July. Two, Witley, June. One, Witley, August. Not common here. Larva unobserved.

NOCTUIDÆ.—Sub-family *Trifinae*.

Agrotis segetum, Schiff.—Fifteen, Witley, June. One, Witley, November. Moth not common. Larvæ not observed.

Agrotis vestigialis, Rott.—One, Witley, June 13th, 1912.

Agrotis corticea, Hb.—Three, Witley, July, 1912.

Agrotis puta, Hb.—Fifteen, May, June, July, August, and September, Witley. Larvæ not observed.

Agrotis tritici, L.—One, July 21st, 1912, Witley. Two, August, 1912, Witley.

Agrotis exclamantis, L.—Twenty-one June, two May, Witley, not uncommon.

Agrotis ypsilon (*suffusa*), Rott.—One, November 3rd, 1918. Taken on ivy at "The Hill."

Agrotis strigula, Thnb.—One, June, thirteen, July, three, August, Witley, not uncommon.

Noctua augur, Hb.—One, July 6th, 1914. Does not appear to be common here.

Noctua castanea, Esp.—Three, July, 1912, Witley. One, August, Witley.

Noctua c-nigrum, L.—Twelve, September, 1912, on sugar at Hambledon. One, August, 1914, Woods.

Noctua triangulum, Hufn.—One, July 6th, 1914. One, July 15th, 1914. Four, June. Witley, not common.

Noctua brunnea, F.—Twenty-two males, July 1st and 2nd, 1914, at

- sugar in Hambledon Woods. One male, June 30th, 1914, Witley. One male, June 26th, 1912, Witley.
- Noctua primulae* (*festiva*), Esp.—Thirty, Witley. Common in June at sugar. Larvæ not observed.
- Noctua rubi*, View.—Five, Witley, in June. Two, August. Six, September.
- Noctua xanthographa*, F.—Ten males, August, Witley. Two females, August. Three males, September. One, April, 1913.
- Noctua plecta*, L.—Three, May, Witley. Two, June. One, August. One, September. Not uncommon at light.
- Axylia putris*, L.—One, July, 1912.
- Triphaena comes*, Hb.—Nine, June. Five, August, Witley.
- Triphaena pronuba*, L.—Common at Witley, June, July, and August. Larvæ found on ivy, but not numerous.
- Triphaena fimbria*, L.—Five males, June, 1912. One, July 1st, 1914. Witley, not common.
- Triphaena ianthina*, Esp.—Three, Witley, August 1st, 1912.
- Eurois prasina*, Fb.—Eight males, June, 1914, Witley. One male, June, 1914. One male, June, 1919, taken on pine tree opposite "The Hill."
- Aplecta tincta*, Brahm.—One male, June 21st, 1918. On a fence.
- Aplecta nebulosa*, Hubn.—Typical moth, common on fences in June and July. Larvæ not observed.
- Barathra brassicae*, L.—Moth common in June and July on fences. Larvæ common from August to October, on cabbage, etc.
- Mamestra persicariae*, L.—One, July, 1913. Two, June, 1919, Witley, taken on fence.
- Mamestra oleracea*, L.—One, June 9th, 1914. Two, July 2nd, 1914.
- Mamestra genistae*, Blch.—Four, June, 1914.
- Mamestra thalassina*, Rott. — Nine, June, 1912, Witley.
- Mamestra dentina*, Esp.—Sixteen, June, 1912-13.
- Dianthoecia cucubadi*, Fuesl.—One, June, 1912, Witley.
- Dianthoecia carpophaga*, Bkh.—One, June, 1913.
- Hecatera serena*, F.—Eight, Witley, June, 1913. To be found frequently on fences.
- Neuronia popularis*, F.—Two males, September, 1912. One male, November, 1913. One male, August, 1912.
- Hadena* (*Eumichtis*) *protea*, Bkh.—Seven, Witley, September, 1913.
- Cleoceris* (*Bombycia*) *viminalis*, F.—Twelve, in July. Fairly common.
- Diloba caeruleocephala*, L.—Larvæ common on apple, sloe, and black-thorn in May and June.
- Luperina testacea*, Hb.—Four, August, 1912. Two, September, 1912.
- Apamea gemina*, Hb.—Three, June, 1912. Four, June, 1914. Found on fences during the day, not common.
- Apamea basilinea*, Fb.—Eight, Witley, June. Found on fences, and not uncommon.
- Apamea secalis*, L.—Moth common in July on walls and fences.
- Apamea ophiogramma*, Esp.—One taken July 30th, 1919.
- Miana strigilis*, Cl.—Common in June and July, both light and dark forms at sugar and on fences.
- Miana fasciuncula*, Haw.—Ten, Witley, June.
- Miana bicoloria*, Vill.—Two males, July, 1912, brown var. One male, August, 1919, typical.

- Xylophasia rurea*, F.—Moth common at Witley in May and June on fences.
- Xylophasia lithoxylea*, Fb.—Not uncommon on fences, etc., in June and July.
- Xylophasia monoglypha*, Hufn.—Very common on fences and tree trunks in June and July.
- Xylophasia hepatica*, Hb.—Common in June and July on fences and tree trunks.
- Dipterygia scabriuscula*, L.—Common on fences and tree-trunks in June and July. One, April, bred.
- Miselia oxyacanthæ*, L.—Not common at Witley. Appears to be common everywhere but here.
- Agriopis aprilina*, L.—One, at Brook, June, 1916. Twenty larvæ found on oak trunk nearly full fed, June, 1918, but all parasitised.—A.A.T.
- Euplexia lucipara*, L.—Common on fences, walls, etc., in June. Taken at sugar.
- Phlogophora meticulosa*, L.—Common on ivy in September and October.
- Mormo maura*, L.—Common in Hambledon Woods. Taken at light and sugar in June and July.
- Hydroecia nictitans*, Bkh.—One, Witley, July 15th, 1912.
- Hydroecia micacea*, Esp.—Two, August and September. Not common.
- Gortyna ochracea*, Hb.—Six, Witley, September. Larvæ very common. On almost all thistles in Hambledon district; prefers thistle to burdock, though have found three or four in burdock stems.—A.A.T.
- Leucania pallens*, Fr.—Common in July. Taken at light in Hambledon Woods.
- Leucania impura*, Hbn.—Six, June and July.
- Leucania comma*, L.—Ten, June, 1914. Three, June, 1912.
- Leucania lithargyria*, Esp.—Twelve. Not uncommon at light.
- Leucania conigera*, F.—Three, July 17th-22nd, 1912.
- Grammesia trigrammica*, Hfn.—Common in May and June at sugar and light.
- Caradrina morpheus*, Hufn.—One, May, 1913. Two, July, 1912-13. Two, August, 1912-13.
- Caradrina taraxaci*, Hb.—Common in July; taken at sugar and at light in Hambledon Woods.
- Caradrina ambigua*, F.—One in May, 1912.
- Rusina tenebrosa*, Hb.—Common in July; taken at sugar and light in Hambledon Woods.
- Amphipyra pyramidea*, L.—Common. Taken in July, August and September, at sugar, in Hambledon Woods. Larvæ common in May and June.
- Amphipyra trayopogonis*, L.—Common in July and August; taken on fence and at sugar in Hambledon Woods.
- Panolis griseo-variegata* (*piniperda*), Gz.—Common on sallow in March and April, and lasts well into May.
- Pachnobia rubricosa*, Hb.—Not common. Two in April and one in May, on sallow.
- Taeniocampa gothica*, L.—Common April and May, at sallow.
- Taeniocampa miniosa*, Fb.—One taken at sallow, March 21st, 1918. Not common here.

- Taeniocampa pulverulenta*, Esp.—Very common at sallow in March. Larvæ common on oak in May and June.
- Taeniocampa stabilis*, View.—Very common at sallow in March. Six, July 10th and 15th, 1912. One, August 9th, 1912. Larvæ to be found on oak chiefly in May and June.
- Taeniocampa incerta*, Hufn.—Very common at Witley in February and March. Also April. One, July 12th, 1912. Larvæ common on oak from April to June.
- Taeniocampa munda*, Esp.—Very common at sallow in March and April. Variable. Three, July, 1912. One, June, 1912. Larvæ common on oak, May and June.
- Taeniocampa gracilis*, F.—One, April, 1912. One, May, 1912.
- Calymnia trapezina*, L.—Taken commonly at sugar and at light. Larva very common on sallow and oak, April to June.
- Dyschorista fissipuncta*, Hw.—Two, July, 1912. Two, June, 1913.
- Plastenis retusa*, L.—One, August 29th, 1912.
- Amathes lota*, Cl.—Six, October, 1913, at ivy bloom.
- Amathes macilenta*, Hb.—Seventeen, October, at ivy. Common.
- Amathes circellaris*, Hufn.—Two, October, 1913, at ivy bloom. One, October, 1913, ab. *ferruginea*.
- Ochria aurago*, F.—One, October, 1914.
- Xanthia lutea*, Ström.—Six, Witley, September and October; taken at sugar.
- Xanthia fulvago*, L.—Eleven, September, 1912, at sugar in Hambleton Woods. Four, October, 1912.
- Orrhodia vaccinii*, L.—Very common at ivy bloom, October and November, and at sallow in March and April. Larva found on oak, but not frequently.
- Orrhodia ligula*, Esp.—One, November 1st, 1918, at ivy bloom. Not common.
- Dasyampa rubiginea*, F.—One, November, 1913.
- Scopelosoma satellitia*, L.—Common at ivy in October and November, and at sugar and sallow in February and March.
- Xylina semibrunnea*, Haw.—One, November, 1913. Taken at ivy bloom.
- Xylina socia*, Rott.—One, January 15th, 1918, and one, April 16th, 1918, on a fence.
- Xylina ornithopus*, Roth.—Three, March. Two, October, one November, at ivy bloom. One, November 24th, on a fence, 4 p.m.
- Xylocampa areola*, Esp.—Common on fences in March and April.
- Cucullia verbasci*, L.—One, Witley, April 20th. Twenty larvæ on verbascum in "The Hill Gardens," June, 1919.
- Cucullia asteris*, Schiff.—Seven, Witley, July 29th, 1919, larvæ taken on golden rod, and bred by L. B. Prout.
- Cucullia umbratica*, L.—Three, June, one, June, not common.
- Anarta myrtilli*, L.—Common on Hambleton Common in June. Larvæ common on heather on Hambleton Common in August and September.
- Heliaca tenebrata*, Sc.—Not uncommon during May in meadows.
- Erastria fasciana*, L.—Sixteen, June, 1918. This series taken by L. B. Prout, at Chiddingfold Woods, on tree trunks.
- Heliothis peltigera*, Schiff.—One, June, 1912.
- Ricula sericealis*, Scop.—Not common. Three, July 11th, 1918. One, August, 1919.

Phytometra (Prothymnia) viridaria, Cl.—One, June 4th, 1918. Three July 11th, 1918. Not common.

Sub-family *Gonopterinae*.

Scoliopteryx libatrix, L.—Common in June and July; also occurs less frequently in March, April, May, and August.

Sub-family *Quadriinae*.

Plusia moneta, F.—Three, June. Three, July. One, August. Not uncommon.

Plusia chrysitis, L.—One, June, 1912. Four, July. One, August. Taken at light in Hambledon Woods.

Plusia pulchrina, Hw.—Four, June, 1912. One, July 12th, 1912. Taken at light in Hambledon Woods.

Plusia gamma, L.—Common from May to September.

Abrostola triplasia, L.—August 29th, 1912, one specimen.

Abrostola tripartita, Hufn.—One, May, 1919. One June, 1912. Two, July, 1912. Two August. Taken on fences at "The Hill."

Euclidia mi, Cl.—Common in meadows in May.

Euclidia glyphica, L.—Common in May and June.

Catocala nupta, L.—Two, Witley, one from larva taken on poplar at "The Hill," June, 1919; emerged in August. One, on a wall at "The Hill," October 8th, 1912.

Sub-family *Hypeninae*.

Laspeyria flexula, Schiff.—One, June. One July, 1918.

Zanclognatha tarsipennalis, Tr.—Not uncommon, April. May, June, and July.

Zanclognatha grisealis, Hb.—One, April, 1914. One, May, 1912. Very early. Can find no other records of such early captures. Four, July.

Pechipogon barbalis, Cl.—One, Witley, 1915. This species is not common here.

Bomolocha fontis, Thnb.—Very common on bilberry in June and early July.

Hypena proboscidalis, Hb. Very common in June and July. Larvæ common on nettles in May and June.

Hypena rostralis, L.—One, May, 1912. Two, September 12th, 1912. One, Wormley. Not common here.

(To be concluded.)

Acalla reticulata, Ström.=contaminana, Hüb.—Its History and its Variation.

By H. J. TURNER, F.E.S.

(Continued from vol. *xxi.*, page 164.)

[STRÖM'S *TORTRIX RETICULATA*.—Mr. Turner, who has so ably given us the result of his researches into the literary history of the moth we have known as *contaminana*, has asked me for a note on certain points I have raised with regard to Ström's description of his *reticulata*. My only knowledge of this is based on Schöyen's German translation as given by Mr. Turner (*Ent. Rec.*, *xxi.*, p. 162), with one correction with which he has since supplied me. In English Schöyen's words

run as follows:—"Phalaena tortrix (*reticulata*), wings yellowish-rust colour, reticulated, with a curved fuscous marginal spot. It is somewhat smaller (than the preceding species called *Tortrix maculata*), basally broader than usual, of yellow-brown colour on the forewings which have many brown lines longitudinally and transversely, and on the costal margin, just in the middle, a dark brown spot, like an angle-hook of which the lowest branch is, however, quite slender and little recognisable in contrast to that broad one.* The hindwings are whitish as well as the body and the legs. It resembles *Phalaena Tortrix modeeriana*."

To my mind this description applies to that form of the species in which the costal spot is for a short distance outwardly oblique and rather broad with the margins parallel, it is then bent inwardly and dwindles away in the centre of the wing. This form we know as *ciliana*, Hb. Here we have the angle-hook with the upper part broad and distinct, the *jenem breiten* (= that broad one), while the lower part is little noticeable. This description cannot apply to the V form which we call *contaminana*, for the lower part of the V could not be described as slender and little recognisable, nor does the V answer to "macula curva." Again here we have three branches, while in *reticulata* there are only two, a broad one and an indistinct one. Schöyen's words put into Latin would read, "Alis ferrugineis, fusco reticulatis, fascia media abbreviata obliqua costali saturatiore." All these words I have taken from Haworth's description of *ciliana*. There seems no reasonable doubt that Ström's *reticulata* is that species which we have so long known as *contaminana*, Hb., and that it represents the form known as *ciliana*, Hb.—ALFRED SICH.]

Stephens *Sys. Catalogue* [1829], contains the following which were subsequently included in his *Illus.* in [1834].

Tortrix rhombana. *Sys. Cat.*, vol. ii., p. 189. (Haw. 418; Hüb. Tort., 173.)

Tortrix contaminana. (Hüb. Tort., 142?; Harris Expos. 94, xxviii. 2-3; Haw. Prod., 32. *xylostean*.)

Tortrix ciliana. (Haw. 419; Hüb. Tort., 171; Don., xi. [xii. in error] 40, pl. 374, 2, *obscurana*; Harris. V. M., 49.)

Teras contaminana. Treitschke. *Schm.*, viii. 250. [1830.]

"As an introduction to almost all the following species of this family it is necessary to make a general statement here, that they vary extremely in definition of colour and markings, more than any other Tortrices. A sufficiently large number of specimens put me in the position of changing many existing names as varieties with much assurance, or of passing them over.

"In *contaminana* we find a good illustration of the above remark. This species is deep yellow and brown, in which coloration it much resembles *plumbana*. Or red yellow when it resembles our *corylana*. (Here belongs Hübner's *ciliana*.) Then it appears dull yellow and suffused with lead colour grey, like Hüb. 142. Finally there is a variety very distinct from all of these; it is brown gray, like the next species *aquilana*, and only differs clearly on head and thorax from the

* Schöyen uses the word "jenem."

latter, in which these parts are white. Single specimens resemble either the one or the other form; all are united by the closest gradations. What is to be said about the *rosana* of Schiffermüller's collection, also a *contaminana* form, has already been done by us under *T. americana*, and also by Charpentier.

"The usual and little variable size is that of *T. plumbana*. Palpi, head, thorax and antennæ agree with the darker portions of the forewings, the legs and abdomen are brownish gray, clear grey, or whitish, the anal tuft of the male is yellow.

"The forewings, as we said, vary extremely, have, in the well-marked examples, an appearance of reticulation with darker colour. Next the base stands an elbowed line, dividing the first area, in the middle of the wing an imperfect or even quite perfect transverse band, in its middle a raised tuft of hairs. Further towards the apex, on the costa, a sharply defined or obsolescent spot. The apex of the forewing extends falcate. The fringes, beyond a dark line, are first whitish and then dark grey.

"The hindwings are white or white-grey, the fringes always white.

"On the underside of the forewings one sees traces of the reticulation, the middle band and the line before the fringe on the upperside; the hindwings are glossy, silky white, the fringes are wholly white, dark bordered at the base."

Stephens in his *Illus.* [1834] considered there were three closely allied species and dealt in considerable detail with their variation. A summary of his remarks are appended. As he was unable to deal with the results of previous continental study his work was to a large extent independent and original. He established the genus *Dictyopteryx* for his species *contaminana*, *ciliana*, *rhombana*, *plumbana*, *loeflingiana* and *forskaleana*, dividing it into two sections. The first, characterised by the "anterior wings with hinder margin subfalcate, acute," and which he said was Hübner's (?) genus *Amelia* ("Verz."), contained the first three of his species. As has been noted above, *Amelia*, Hüb. (Verz.) was applied to *rhombana* only. It should have been *Acalla* which was the first generic name including a member of this group of forms, viz., *ciliana*.

Summary of the variation given by Stephens.

Dictyopteryx contaminana. Steph. *Illus.*, vol. iv., p. 169. (*Amelia*, Hüb.) "Alis anticis stramineis rufo-pulcherrimè reticulatis, costa basi fasciæque media sinuosa bifida ustulatis, ciliis albis." 7-8½ lin.

Ground: Forewing, pale straw; yellowish; reticulated reddish-brown.

Markings: Streak at base; broad fascia behind middle darker brown, bifid at costa.

Margin: extreme hind margin reddish-brown; cilia white. Hindwings whitish.

Variation: broadly brownish at base; ground ferruginous or reddish.

Dictyopteryx ciliana. Steph. *Illus.*, vol. iv., p. 169. (*Amelia*, Hüb.)

"Alis anticis ferrugineis fusco rufove reticulatis, fascia media obliqua costali saturatiore." 7-9 lin.

Ground: forewing ferruginous; faintly reticulate fuscous or red.

Markings: obscure; short waved dusky fascia in middle of costa, darkest towards disc.

Margin: extreme hind margin dusky; cilia white, hind portion dusky. Hindwing whitish or pale brownish.

Variation: more or less deep reticulation sometimes; lighter or darker ground or straw colour; sometimes an oblique dusky fascia towards base.

Dictyopteryx rhombana. Steph. *Illus.*, vol. iv., p. 170. (*Amelia*, Hüb.)

"Alis anticis ferrugineis subreticulatis, fascia completa sinuosa media nigricante." 7.9 lin.

Ground: forewing dark ferruginous; reticulations fuscous obsoletely.

Markings: obscure streak before middle; much waved fascia in middle; colour spot on costa nearer hind margin; all markings dusky brown.

Margin: cilia whitish; hind portion dusky. Hindwing whitish or pale brownish.

Variation: central fascia interrupted or 'wanting, *i.e.*, obsolete; costa ferruginous only, rest deep rusty brown.

Duponchel. *Hist. Nat. Lep.*, vol. ix., p. 172, pl. 244, fig. 10. [1834.]

Teras contaminana. A good figure. Reticulation hardly clear enough; hindwings too smoky. Not the "spotted" form and no trace of the *ciliana* form. No other markings than the Y developed.

Duponchel. *Hist. Nat. Lep.*, vol. ix., p. 174, pl. 244, fig. 11. [1834.] = *Tort. rhombana*, W.V., Illig., Goetze, and Hüb. 175 ♀, Treit. viii. 71.

Teras rhombana. A good figure of a dark *ciliana* ferruginous form, and certainly not *rhombana*, as understood by Hübner's figure. The figure is very like a specimen in my collection, with the central fascia very dark not Y shaped, the basal spot not centred nor extended; and with the apical area filled by a large blotch to the inner angle; the reticulation is shown.

"The forewings, of which the costa is entire, are above of a testaceous ferruginous colour, reticulated with brown, and crossed in the middle by a blackish band which forms a very pronounced angle with the costa externally and gives origin exteriorly, to a line of the same colour forming an elbow and joining the costa near the top of the wing," and so on more or less in disagreement with the figure.

"This description is that of the female only, the male is unknown."

We next deal with the three figures of Wood. *Ind. Ent.*, [1839]. fig. 1107, Dict. *contaminana*. [A good figure of the common form.] fig. 1108, Dict. *ciliana*. [A good average figure of the ferruginous form with the basal dark spot which is not centred. There is also an irregular spot in the middle of the marginal area.]

fig. 1109, Dict. *rhombana*. [A good average figure of the dark (not the darkest) form with very obsolescent central fascia.]

Herrich Schaeffer refers to a form from Lapland as a *contaminana* form. [*Syn. List.*, iv. 10 (1856 ?).]

(To be concluded.)

NOTES ON COLLECTING, Etc.

STIGMELLA (NEPTICULA) FLETCHERI, TUTT, IN SOMERSET.—On July 31st, 1917, I bred a specimen of *S. fletcheri* from a mine gathered off a rose bush growing in a hedge at Bathford, near Bath. The late Mr. J. W. Tutt says of this species, "Probably widely distributed all over the British Islands" (*British Lepidoptera*, vol. i., p. 213). Owing to this species not having been distinctly differentiated previously to the publication of that volume, where it is described for the first time, Tutt was only able to cite six counties in which it had certainly occurred. Somerset is an addition.—ALFRED SICH, F.E.S. April 19th, 1920.

NOTES ON COLLECTING IN ITALY (1918 AND 1919).—(Continued from page 63.)—March 8th.—To-day the two "Bumble" Bees, *Bombus terrestris* and *Bombus hortorum*, with their pretty stripes of yellow, black and white, have been crowding to the blossoms of *Corydalis cava* and I have taken for the first time this year *Bombus agrorum* variety *pascuorum* (Scop.), which is generally distributed throughout northern Italy and frequents the blossoms of the *Labiatae*, *Umbelliferae*, and *Papilionaceae*.

March 10th.—I spent to-day at Padua. In the Instituto Zoologico, a branch of the Royal University, where Doctor G. Teodoro, a professor of the University, kindly showed me the Natural History Collections which are housed there, there apparently being no Natural History Collections in the Museo Civico. Here I saw a good type collection of European Butterflies and Moths which had, however, rather faded from exposure to light; also a collection of Exotic Butterflies and Moths in good condition, with small general collections of Coleoptera, Diptera, Hymenoptera, and Orthoptera. In a separate collection of Italian Lepidoptera, somewhat neglected, I noticed specimens of *Coenonympha oedipus* from Piedmont, *Chrysophanus thersamon* from the Bologna district, and the large Dragon-flies *Aeschna formosa* and *Libellula quadrimaculata*, both of which species are found along the canal banks which intersect Padua. I also visited the Orto Botanico which is close to the glorious church of Santa Giustina. This fine old botanical garden, founded in 1545, contains several large hot-houses, and in the wilder portions are many trees and plants, of which I made a list of seventy different species in flower on this beautiful spring morning. The main building contains a good library and portraits of distinguished botanists of all countries. I was especially struck in the gardens by the bright pink flowers of the Heath, *Erica carnea*, which were out in mass under the hot sun, with Honey Bees and hibernated specimens of *Polygonia c-album* crowding to them.

March 12th.—The females of *Pieris rapae* were fresh on the wing up and down the green slopes of Monte Berico, accompanied by the males and females of *Pieris napi*, which were also fresh and abundant. One male of *Hesperia malvae* fell to my net, apparently just emerged. The largest yellow-green lizard I have ever seen in western Europe scuttled away to its rocky home from among the herbage, and *Ematurga atomaria* was flying over the grass.

March 13th.—This afternoon, at the top of the winding slope which leads up through the gardens towards the top of Monte Berico, I saw three specimens of the large Orthopteron *Aceridium aegyptium*, and managed to secure one male with my hand as it settled on a tree

trunk. The day being dull, the insect was rather listless and not inclined to fly far, though this species is difficult to approach on bright days. This Grasshopper is found in every province of Italy, and is also frequently common in Sicily and Sardinia. The male is from 32mm. to 47mm. in length, and the female varies from 50mm. to 66mm. I also took a fresh specimen of *Pararge megera* at the top of the hill; later this species will be abundant here.

March 15th.—After several days of wet weather and thunder fresh butterflies have emerged and the sun is shining with great power on the slopes of Monte Berico. The males of *Pieris brassicae* were flying and some that I have caught are rather small and remarkable for deep grey tips on the forewings instead of the usual black colour. I took a fine large hibernated specimen of *Eucanessa polychloros*, which species is abundant in this district, though not always easy to catch. A freshly emerged female specimen of the first brood of *Celastrina argiolus* was fluttering over the green herbage and seeking the young shoots and budding leaves of the Common Bramble and other bushes on which to rest. A single specimen also of *Coenonympha pamphilus* flew up and down a small grassy path in the bottoms of Monte Berico, and I secured a fresh specimen of the common *Rumicia phlaeas*. This butterfly is by no means so generally common in northern Italy as in the south of England.

March 17th.—This afternoon on the higher slopes among the shrubs planted in the gardens of Monte Berico, *Aceridium aegyptium* was now very plentiful but unapproachable on this bright day, and I was unable to secure even one. They fly from shrub to shrub or from tree to tree, where they alight on the stronger twigs or stem, and remain as a rule quite still, but always ready for the next flight if approached closely. They make a decided noise with their elytra and wings when in flight, and are difficult to see when settled on twigs or tree stems as they so much resemble the dull colour of the twigs, etc., on which they rest. A single male specimen of *Pararge aegeria*, L., was caught on the winding grassy road leading through the gardens, and a single hibernated male of *Colias edusa* was found to be in good order, but of pale colour, when I took it near the grassy bottoms of Monte Berico. A hibernated male specimen of *Issoria lathonia* was in good order though small. Later in May, the fresh specimens will be common on these hillsides. At the bottom of the walk below the seminary on the hill-top, a small tree that was exuding sap was a feast of joy for several specimens of *E. polychloros* in various conditions. The imagines of *R. phlaeas* were more plentiful to-day and a study in variation; the majority of this first spring brood are smaller than the usual type, whilst the markings and colouring vary considerably.

March 19th.—For some days the males of the Emperor Moth (*Saturnia pavonia*) have been dashing about in the hot sun, and this afternoon I found a freshly emerged female of this moth sitting up on a twig drying her wings, on the lower slopes of Monte Berico. This moth is found commonly up to 1500m. in Italy, in spring, but is more addicted to the northern than the southern portion of the kingdom.

Some of the hibernated specimens of *Aglais urticae* were worth taking, but the majority were unfit for the cabinet; not so those of *Polygonia c-album* which are fairly numerous and in excellent condition

after their winter rest. In the bottoms of the valley below the Villa Pagello I took a male specimen of the grey-brown Skipper *Carcharodus alceae*, apparently freshly emerged. This species is very common everywhere in Italy from spring to autumn, and frequents gardens, fields, and other cultivated places, both in the plains and on the mountains.

During the whole of March the Hemipteron *Rhaphigaster sagittifer* has been very abundant, entering our Villa Pagello, where it has a great partiality for the open window sills, and also the interior and exterior walls of the Villa. This insect, which belongs to the Emitteri and which is extraordinarily abundant in Italy, frequents currant and gooseberry bushes and many fruit-bearing trees. It is not a welcome visitor as it emits a most repugnant odour, especially after the least touch. In length it is 15mm.-16mm., of yellowish-grey or brownish colour, and is completely covered with dark spots. The antennæ are black ringed with white. Another of the "Solitary" Bees, *Psithyrus rupestris*, is now common on the hillsides of Monte Berico. It is found chiefly in the mountainous districts of Northern Italy, where it settles often upon rocks or on the flowers of the fields. The perfect insect, in general appearance on the wing much resembles *Bombus agrorum* var. *pascuorum* (Scop.), and they both look very handsome under the strong light of the sun.

March 23rd.—The weather for the past three or four days has been so bad that it has been almost impossible to make any fresh observations worth recording. We have had a succession of high winds, rain, a slight fall of snow, with frequent changes of temperature, necessitating a frequent return to overcoats. In the covered arcades leading down towards Vicenza, I found this afternoon a freshly emerged specimen of the moth *Taeniocampa incerta*. On the high slopes of Monte Berico near the gardens I also found to-day the bright fresh blossoms of *Forsythia viridissima*, a pretty garden shrub; also those of the charming *Anemone coccinea*, which grow singly on certain parts of the hillsides.

March 25th.—The weather has considerably recovered, though "March winds" are in evidence as in England. I have to-day taken the following species of Hymenoptera on Monte Berico, viz., the Wasp *Polistes gallica*, and the Solitary Bee *Nomada succincta*; also the Rhynchota *Eysarcoris aeneus*; and the Beetle *Anthaxia manca* (Fab.), of the family *Buprestidae*. Lastly I have taken a specimen of the Dipteron which is common here, and noisy as well as conspicuous, viz., *Volucella pellucens*, a parasite of the *Bombus* Bees.

March 27th.—This morning Signore A. E. Baruffaldi of Vicenza most kindly brought me a small nest of the Wasp *Polistes gallica* found in a rather curious place—between the folds of a small woollen bag upon the kitchen chimney of his house. Signore Baruffaldi has been most kind in helping me to name the various species of Hymenoptera, Coleoptera, etc., which I have found during my stay at Vicenza and in many other ways.

This afternoon I netted on the slopes of Monte Berico a fine specimen of *Iphiclidides podalirius* apparently just emerged.

I left Vicenza for good at the end of March, 1919, for Turin.

The following are a few more species of various orders found during the month of March at Vicenza not mentioned in the previous notes, as I was unable to name them for various reasons until after my final return to England in October, 1919.

RHOPALOCERA:—*Pieris napi* var. ♀ *bryoniae*, *Brenthis dia*, *Everes argiades*, and *Nisoniades tages*.

PLANTS, ETC., IN BLOSSOM:—Of these I recognised 24 different species during March at Vicenza.

HYMENOPTERA:—*Bombus ligusticus*, *Osmia cornuta*, *Ophion obscura*, and *Bombus lapidarius*.

DIPTERA:—*Eristalis tenax*, *Catabomba pyrastris*, *Brachypalpus vulgus*, *Chrysotoxum italicum*, and *Nomada succincta*.

NEUROPTERA:—*Phryganea flavicornis* (?), *Phryganea grandis* (?).

COLEOPTERA.—*Carabus granulatus*, *Lema brunnea*, *Blaps similis*, and *Meloe proscarabaeus*.—Lieut. E. B. ASHBY, F.E.S. (To be continued.)

A BREEDING RESULT.—The following occurrence illustrating the unexpected prizes which now and then crop up for entomologists may be of interest for your readers.

On April 26th last I placed in a cardboard box, with lid partly cut away and the space very carefully covered with muslin, a larva of the common *Arctia villica* found that day. This larva duly spun up in about a week's time, and a day or two ago showed signs of pupating. To-day (May 2nd) on going to inspect the box I found not only the pupa of *villica*, but also resting on the muslin cover inside the box a freshly emerged Alder Moth (*Acrionicta alni*), a somewhat uncommon species.

I am absolutely certain I placed no other larvæ or pupæ in the box than the *villica*, and it was obviously impossible for the *alni* to have crawled into the box. The box was on a shelf in the greenhouse.

I have exhaustively searched the box and can find no trace of any empty pupa case, and the box contained nothing else than a little fine earth and a piece of cork attached to which is the cocoon and live pupa of the *villica*.

I have never seen a larva of *alni*, nor have I heard of the moth being taken in this neighbourhood or ever come across a live specimen of the perfect insect until to-day.

Probably you will think this story ought to have been sent either to Messrs. Maskelyne and Cook, or to Mr. Vale Owen and not to a serious scientific entomological publication. The facts nevertheless remain.—B. BARNARD CRUIKSHANK, Gosport, Hants. May 2nd, 1920.

THE WICKEN FEN FUND, 1920.—It would seem hardly necessary to say more than to remind our readers that the Treasurer of this most useful fund, Mr. W. G. Sheldon, Youlgrave, South Croydon, is at the "receipt of custom," and to ask all to send him their annual contributions at an early date, and to obtain further subscribers from their fellow entomologists.

CURRENT NOTES AND SHORT NOTICES.

The *Bolletino del Laboratorio di Zoologia Generale e Agraria*, Vol. xiii., 1919, has just come to hand and contains investigations of the life histories of various insects of economic importance, including the genus *Anastrophra* (Dip.), the *Aganini* (Hym. Chal.), the Coccid (*Sphaerolecanium prunastri*) of the plum-tree, and that of the nut-tree (*Eulecanium coryli*), and a long article with many illustrations of an irruption of

species of field mice in Puglia doing enormous damage to all the crops, in 1911 and again in 1916.

In the *Ent. News* for February, Prof. T. D. A. Cockerell gives an account of the species of *Halictus* (Hym.) which visit evening flowers, with a large number of personal observations carried on for many years. He reports some species as flying about the flowers earlier in the evening before any signs of opening was visible. W. L. MacAtee writes on "Specific, Subspecific and Varietal Categories of Insects and asserts that "Entomologists will do well to profit by the experience of workers in ornithology and mammology," a remark which to entomologists is like asking that the "mountain go to the molehill." The writer sums up the forms which up to a few years ago were lumped together under the term "variety." We quote his remarks—"A variety in entomology, actually of less than specific rank, may be one of three things: (1) It may be a true subspecies or geographic race, present material being insufficient to decide the point; (2) It may be a colour phase, that is, albinistic, melanistic, erythroic or the like, an appearance it may assume anywhere in the range of the species that may affect all subspecies alike (proof of its nature) but which usually is recognisable as a phase of a simple colour gradation, often as the alternative of two colour states as albinism and melanism, and it should not have a name which will have to be reckoned with in scientific nomenclature; and (3) It may be a variety such as is known in many insects that cannot be subspecific in its nature, because unrelated to distribution, that does not answer to the definition of colour phase, here given, but the real nature of which admittedly is not understood. It seems to the writer that these varieties have the importance, and in a way the attributes of subspecies except correlation with geographical distribution, and that they should be named. From a purely nomenclatorial point of view the fact that we do not know what colour varieties really are is unimportant, and the writer's contention is that we shall be much longer learning what they are, unnamed, than if named." We would add, what has always been our contention, that each name after the species name should have its nomenclatorial rank prefixed, to inform readers and subsequent students the position of mind of the writer as to the gradation of the form. Much of the article gives food for thought on the vexed Nomenclatorial question. We note that a duplication of names, to which we called attention some months ago, has now been corrected. The *Coleophora apicella* being a pre-occupied name, *C. apicialbella* is proposed for the species described in *Ent. News*, xxx. 109 (1909).

The *Irish Nat.* for March contains an article on the "Coleoptera in Co. Kerry," by Oliver E. Janson, F.E.S., giving an account of a holiday spent there in June, 1919. He records eight species not recorded in Johnson and Halbert's Irish List, and mentions a number of species in which melanism was much pronounced. The Rev. W. T. Johnson gives a series of further notes on "Irish *Ichneumonidae* and *Braconidae*," and Sir Charles Langham, Bart., deals with the occurrence of Odonata in 1919 in Co. Wicklow. Practically the whole number treats of Entomology.

The *Ent. Mo. Mag.* for March gives a very interesting account of the life of Lord Walsingham from the pen of Mr. J. H. Durrant, who for so many years was associated with him at Merton. Dr. R. C. L.

Perkins writes a series of "Notes on British *Psammocharidae* (*Pompilidae*)," giving an analysis of the species dealt with. Mr. T. Laing deals with the Aphid genus *Atheroides*, and gives detail figures of the various species in Britain.

The New York Agricultural Experimental Station continues to add to its admirable series of *Bulletins* from the Geneva station. The latest, "The control of the Green Apple Aphis in Orchards," deals with the *Aphis pomi* of De Geer, which has, like most of the immigrant aliens in the New World, increased and multiplied abundantly in some fruit growing areas. The life-history and methods of attack of the aphis are dealt with in detail. It is stated that the fruit is also much disfigured by the sooty fungus (*Fumago vagans*) which thrives upon the excretions of the aphis. The conclusions drawn from the experiments carried out are that in regions known to be annually attacked reliance should be placed on "the delayed dormant" treatment with lime, sulphur, and nicotine sulphate, together with a supplementary spraying during midsummer with nicotine sulphate and soap "when the aphis threatens to develop in destructive numbers." There are several plates of figures showing attacked foliage and fruit.

The *Entomologist* for February contains another very useful contribution to the biology of the more or less unknown life cycles of the smaller Lepidoptera from the pen of Mr. W. G. Sheldon. This time he deals with *Lobesia permixtana*, the larvæ of which he found fed well upon oak and refused birch and golden rod upon which it had previously been stated to have been found. There are articles on Crimean Lepidoptera by V. V. Nabokoff, on South Hants and S. Devon Lepidoptera by A. E. Burras, on Butterflies in Macedonia by H. Mace, and on Norfolk Lepidoptera by G. H. Gurney. Leonard Tatchel has a capital figure of a striking aberration of *Arctia caia* recently bred by him.

The *Report and Trans. of the Cardiff Naturalists' Society* for 1917 has recently come to hand, and contains a deal of matter of local interest and a continuation of the records and observations made in the various sections. The article in which we are more particularly interested is the "Lepidoptera of Glamorgan," by H. M. Hallett, F.E.S., who has collected all the records from various authorities and with his own personal records has compiled a most useful annotated list of over forty pages, which no doubt should be much larger had there been more devotees to the micro-lepidoptera. We know that in some quarters it is customary to sneer at "county records," but it is only by such periodical gathering together of local observations, a work which is usually undertaken with considerable enthusiasm, that questions of distribution can be advanced and general progress in our study made. Especially is this so when a short note is added on the geographical conditions of the area worked, soil, aspect, vegetation, rainfall, etc. The arrangement is that given in those admirably illustrated volumes on the British Butterflies and Moths by R. South, a wise proceeding perhaps, as these are so universally used by beginners, and are found in most public libraries, while at the same time the author recognises the fact that "various changes" have been made in nomenclature since the issue of these volumes. More than fifty species of butterflies have been recorded for the county. Still there is much to be done, only seven species of "Plumes," two species of *Coleophora*, four of *Scoparia*

(sens. lat.), two *Argyresthia*, eight *Depressaria*, one *Micropteryx*, etc., have up to now been recorded. This List wanted doing, and will be quite indispensable to all future workers in the order in the county.

SOCIETIES.

THE ENTOMOLOGICAL SOCIETY OF LONDON.

February 4th, 1920.—ELECTION OF FELLOWS.—Miss Winifred E. Brenchley, D.Sc., F.L.S., Rothamsted Experimental Station, Harpenden, Herts; Messrs. Alfred Ellis Burras, 3, Connaught Road, North End, Portsmouth; Albert Ernest Hodge, 14, Astonville Street, Southfields, S.W. 18; Rev. Melville Jones, 16, New Bridge Street, E.C. 4, and Hope Fountain, Box 283, Bulwayo, Rhodesia; Messrs. George Beddome Curtis Leman, George Curtis Leman, Sydney Curtis Leman, Wynyard, 152, West Hill, Putney Heath, S.W. 15; and Frank Reginald Mason, Oxford, Harpenden, Herts, were elected Fellows of the Society.

NOMINATION OF VICE-PRESIDENTS.—The President announced that he had nominated Dr. A. D. Imms, the Rt. Honble. Lord Rothschild, and Mr. W. G. Sheldon, as Vice-Presidents for the ensuing session.

THE PROTECTIVE MOVEMENTS OF THE CONSPICUOUS LARVA OF THE CATOCLINE MOTH, *COCYTODES CÆRULEA*, GUÉR.—Prof. Poulton exhibited a coloured figure of the moth taken in Fiji; also the moth bred from one of the larvæ by the same naturalist.

MOTHS FLYING, BUT NOT AT REST, CAPTURED BY BATS.—Prof. Poulton drew attention to an observation by Mr. W. Feather at Kibwezi, B.E. Africa, that he had watched the bats flying in the room and taking moths, mainly *Cylogramma latona*, Cram., and *C. limacina*, Guér.

MUSCA AUTUMNALIS, DE G. (CORVINA, F.), HYBERNATING IN A LOFT AT ST. HELEN'S, ISLE OF WIGHT, AS IN 1914-15 AND 1917-18.—Prof. Poulton said that he had visited the loft on December 16th, 1919, and found one long narrow patch of many hundred flies and another small one of several dozen. A few were swept by hand from the former patch into a small box, and, when examined, were found to consist of 11 ♂s and 24 ♀s of *M. autumnalis*.

OPHION UNDULATUS, GRAV., BRED FROM BOMBYX QUERCUS, L., COCOONS, FROM N. STAFFORDSHIRE.—Prof. Poulton exhibited six examples of this fine Ichneumonid, said by Mr. Claud Morley to be common neither here nor on the continent (*Brit. Ichneumons*, vol. v., *Ophioninae*, p. 279).

OBSERVATIONS ON THE RED (GREGORYI, DIST.) AND GREEN (SPECIOSA, MELICH.) FORMS OF THE HOMOPTERON *ITYRÆA NIGROCINCTA*, WALK., AT KIBWEZI, B.E. AFRICA.—Prof. Poulton reported the detailed observations made on this subject by Mr. W. Feather.

EXOTIC RHOPALOCERA.—Mr. G. Talbot exhibited the following species on behalf of Mr. J. J. Joicey:—*Dasyophthalma rusina*, Godt. A melanic aberration of the female in which the bands are only present as vestiges. *Papilio ridleyanus*, White. Dark aberrations of the male in which the red spots of the forewing are obscured by dark scaling, which have received the name of *fumata*, Niep. *Papilio phidias*, Ob. A male example of this very rare and extraordinary species from Tonkin. *Heliconius* from Matto Grosso:—1. A distinct form of *eleratus*, Nold., probably undescribed and connecting this form with *bari*, Ob. 2. A

species of *melpomene* race *thelaxiope* from Para, showing its great likeness to the *elevatus* form. 3. Five striking forms of *melpomene* race *penelope*, Stgr. 4. Forms of *melpomene* race *amandus*, Gr.-Sm. 5. *H. erato* race *phyllis*, Fbr. This form chiefly resembles the *amandus* form above. 6. A form of *erato* race *phyllis* which resembles the *hydara* race. This is probably new. 7. A form of *erato* similar to the *erythraea* form from Guiana. 8. A form of *erato* near *ottonis*, Riff. 9. A form of *erato* near *tellus*, Ob., with a yellow discal spot on the hindwing. 10. A series of *erato* race *tellus*, Ob., showing variation in the yellow patch of forewing similar to what is seen in specimens of this form from French Guiana. 11. *H. xanthocles* race *melete*, Feld. A form with the yellow patch showing a larger black spot than in typical specimens from Upper Amazons and Peru. 12. A form of *aeode* showing condensed yellow patch in forewing, and thereby exhibiting a transition to *astydamia*, Erichs. 13. *Eucides*, sp. nov., allied to *eueidina*, Ob., also shown. It is evident that the Matto Grosso district around Cuyaba would yield some very interesting results in *Heliconius* if a large collection were made.

EUROPEAN ORTHOPTERA.—Lieut. E. B. Ashby exhibited many species chiefly from Arquata Scrivia, N. Italy.

LARVA AND PUPA OF A MORPHO.—Mr. Hy. J. Turner exhibited a tinted photograph of the larval habit of assembly, when not feeding, of *Morpho laertes* (?) sent to him by Mr. F. Lindeman of São Paulo, Brazil, and also a coloured photograph of the pupa *in situ* showing its close protective resemblance, and read a long detailed note from his correspondent.

SOME ITALIAN RACES OF *ZYGÆNA TRANSALPINA*, ESP.—Mr. Hy. J. Turner also exhibited several races of the very variable *Zygæna transalpina* from peninsular Italy, sent to him by Signor Querci, and stated the relationship of the various forms as explained by Dr. Verity of Florence. He questioned whether the relationship of the forms as at present suggested would stand when the races occurring in other parts of the peninsula had been studied.

Lord Rothschild observed that the same range of variation was exhibited in *Z. ephialtes*.

AN AUTOGRAPH OF CHARLES DARWIN.—The Rev. F. D. Morice exhibited a book of Charles Darwin's (*Descent of Man*) given by the author "with kind regards" (autograph) to the late Mr. Roland Trimen.

REMARKABLE DEVELOPMENT IN THE HIND LEG OF A FEMALE BEE.—Mr. Morice also called attention to the very abnormally developed hindlegs of a ♀ bee of the genus *Megachile* from Mesopotamia, apparently belonging to a section of the genus in which no character at all similar had yet been described in either sex.

ABERRANT PLUSIAS.—Lord Rothschild exhibited two aberrant specimens of the genus *Plusia* in which species remarkable aberration is very unusual.

EAST AFRICAN FLATIDÆ.—Dr. C. J. Gahan exhibited specimens of the East African *Flatidæ* named *Ityraea patricia*, Melich., *I. speciosa*, Melich., *I. electa*, Melich., and *I. gregoryi*, Dist., and said he believed them to be all forms of the South African species *Ityraea nigrocincta*, Walk., with which they agree in structural characters.

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Duplicates.—*Phigalia pedaria*, melanic and intermediate forms in great variety.

Desiderata.—Numerous common species.—*M. Corbett, 3, Thorne Road, Doncaster.*

Mr. Donisthorpe will still be glad to receive ants and Myrmecophiles from all parts of the British Isles, and to name any such for anyone who is kind enough to send them to him. He would however suggest that ants from any other parts of the world be sent to his colleague, Mr. W. C. Crawley, 29, Holland Park Road, W. 14. Mr. Crawley is specialising on the ants of the world, and it is a matter for congratulation that we should possess an Entomologist in this country whose whole attention should be concentrated on this branch of Entomology.

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m. 1920, June 2nd; October 6th and 20th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.—*Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E. 3.*

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society).—Hall 20, Salisbury House Finsbury Circus, E.C. The First and Third Tuesday in the month, at 7 p.m. Visitors invited. *Hon. Sec., J. Ross, 18, Queens Grove Road, Chingford, N.E.*

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Journal of Variation

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Collecting in Turkey in 1919.

By Major P. P. GRAVES, F.E.S.

My chief captures of the past year—*Hamearis lucina*, *Lampides boeticus* and *Melanargia larissa*—all new to me at Constantinople have already been noted in the *Ent. Record*. A fourth—*Hipparchia briseis*, of which I caught a damaged male early in September at Kiathané, is also an addition, but I am sure this insect occurs in some of the very suitable dry areas, which I have not yet worked in July and August.

Butterflies—with the exception of a few species, e.g., *Plebeius aegon*, *Polyommatus icarus*, and at one locality *Agriades thersites*—were not very common, save in the first half of August, when I found quite a number of species in large numbers at Kiathané—notably *Erynnis orientalis*, *Hesperia armoricanus* and *Scolitantides baton*. I took on August 16th at Kiathané in a damp spot, which in the spring had given me what I took for *H. malvae*, a ♂ specimen either of this species or of *H. malvoides*. As soon as postal communications with the outer world are reasonably secure I shall have the genitalia of this specimen examined. So far the only Constantinople *H. malvae*, which has been sent by me for microscopic examination, proved to be *H. malvae*—neither *H. pontica* nor *H. malvoides*. Is it possible that *malvae* in this latitude has a partial second-brood?

Many normally safe localities near Constantinople were unsafe. A few days after I had paid a visit to Gyök-Su, “brigands”—who bore a most curious resemblance, so I learnt, to some missing gendarmes, carried off three market gardeners, whose families had to pay up a trifle of 1500 Turkish pounds—paper pounds, praise be to Allah!—before they were released. Several evildoers haunted the Alemdagh Forest during the summer and committed a series of horrible crimes that shocked even the case-hardened gendarmes, who at last rounded up the band and shot fourteen out of fifteen of them. Their last exploit had been to torture a man and woman, whom they found tramping along the roads in search of work, till both went mad. They were a mixed crowd, Turks and Albanians. So I failed to hunt for *Bithys quercus*, *Melitaea athalia* var. *mehadiensis* and *Argynnis cydippe* in these fine woods this year.

I paid a good deal of attention—inspired by Dr. Verity's fascinating paper—to the subject of the emergence of various Rhopalocera and Grypocera, and having found my collection and notes practically intact was able to look up past records. My deductions, which are still provisional in some cases, are the following:—

1. The *quies aestiva* in this region lasts from about July 10-15 to July 25-31. This state is more marked in dry and open, than in moist and wooded, areas.

2. Frost so seldom occurs with any intensity before Christmas, and November and early December are so frequently warm and bright, that I am inclined to consider that the offspring of the *P. icarus* and *Coenonympha pamphilus*, which appear late in October and differ little from the vernal specimens, have a very fair chance of survival, and that their parents should be deemed a true, if partial third brood.

3. Of the Urbicolids and Lycænids (*sensu lato*), the following are certainly triple brooded:—*Erynnis alceae*, *Rumicia phlaeas*, *Loweia dorilis*, *Aricia medon*, *A. anteros* and *P. icarus* (partially). I have not

JUNE 15TH, 1920.

yet made up my mind as to whether the long summer emergence of *Chrysophanus thersamon* represents one or two 'broods.' My dates cover a period beginning at the very end of June and terminating in mid-September. The following are certainly double brooded:—*Nisoniades tages*, *Erynnis orientalis*, *Hesperia armoricanus* (seemingly triple brooded at Smyrna), *Powellia orbifer*, *Plebeius aegon*, *Agriades thersites* and *Cupido sebrus (osiris)*. I am not certain whether *Scolitantides baton* has two or three broods. So far I have remarked with this species, two periods of relative abundance—late April or early May according to season being the first, and the end of July and first half of August being the second. But fresh or comparatively fresh specimens may turn up according to my records in June, early July, and late September.

Celastrina argiolus has certainly two broods. Specimens taken in September have not been fresh enough for me to assume the existence of a third brood with complete confidence.

Turning to other groups—*Papilio machaon* has three broods, the main emergence of each being in April, late June and early July, and September in normal years. *Pieris brassicae* has certainly three broods, possibly four, and except in May, when it is rare and ragged in ordinary years, may be found in good order any day between March 20th and November 15th. *Pieris rapae* first appears somewhat later and can be taken fresh and frequent in early November. *Pieris napi* seemingly emerges in the last 10 days of March and the first half of April in normal years. Its second brood is well out by June 12th, and "forwards" showing the characteristic features of that brood may occasionally be taken in the last days of May. A third brood appears in September. My only *Pontia chloridice* was taken at a date, which suggests a third brood, viz., September 8th.

Ipheclides podalirius may be, and *Brenthis dia* certainly is, triple-brooded. Other possibly triple-brooded species are *Melitaea trivia* and *Leptosia sinapis*, while *Parargis megera*, *Colias edusa*, and *Pontia daplidice* are regularly triple-brooded. On the other hand I have not yet taken "second brood" specimens of *Melitaea cinxia*, or *Cyaniris semiargus* in this neighbourhood. Worn ♀s of *Satyrus circe* and *Epinephele jurtina* appear, as noted in Tuscany by Dr. Verity, in late August and early September. This seems to be the case with *Hipparchia semele* as well, though here ♂s are to be found with ♀s in early September.

KURY YALOVA.

From August 21st to August 23rd last year I stayed at this place, but my collecting was badly disturbed by the bites of flies—one species which regularly bit between eye and ear being peculiarly inimical—and I spent part of August 22nd in bed with a touch of fever and a face in which eyes and other features required some looking for. I took or noted the following species:—*Nisoniades tages*, *Erynnis alceae* (worn), *Hesperia armoricanus*?, *Chrysophanus thersamon* 1 ♂, *Loweia dorilis* 1 ♂ just out, *Everes? alcetas* (worn), *P. icarus*, *P. aegon* near Yalova port, *Raywardia telicanus*, *Aricia medon* (very worn), *I. podalirius*, *P. rapae* or *P. manni* one worn ♀ only, *P. brassicae*, *Colias edusa*, *G. rhamni*, *L. sinapis* very fresh and large, *Polygonia c-album*, *Pyrameis cardui*, *P. atalanta*, *Limenitis camilla*, *Dryas pandora*, *D. paphia* (worn), *Melitaea didyma* (fresh), *S. circe* (worn), *S.*

syriaca (worn), *S. statilinus* var. *fatuaeformis* (a few fairly fresh ♂s seen, one ♀ taken), *E. jurtina* (worn ♀s), *Pyronia tithonus* (worn), *Pararge megera*, *P. aegeria* (a few), and *C. pamphilus*.

One expected better results from a well wooded valley in Bithyria even so late as the third week of August, but I had not really the time to work the vicinity of the hotel, and if I visit the place again late in the season, I must try to explore the neighbouring mountains, which run up to about 3,000 feet and are well supplied with pine-woods. But a remedy or a protection against the local fly "imposes itself" as the French say, and without either I fear Kury Yalova in Autumn.

On Emergence of the Grypocera and Rhopalocera in relation to Altitude and Latitude.

Illustrated chiefly by the Sibillini Mts. (Central Italy) and by the Baths of Valdieri (Maritime Alps).

By ROGER VERITY, M.D.

(Concluded from p. 71.)

The two localities above-mentioned offer examples of the greatest modifications which altitude can produce in the emergence of Lepidoptera. It is needless to add that in intermediate altitudes, generally speaking, lesser modifications are found, but on the other hand local causes have notable influence. Thus, on the hills in the neighbourhood of Florence alone sensible differences are observed both in the epochs of emergence and in the aspect of the species. Mount Fanna, 600 m. high, is identical with the plain below; Mount Conca, above Fontebuona di Vaglia, which rises on the northern slope of Monte Morello, at only 400 m., offers a different fauna from that of the plain, and a later emergence.

In the mountains the annual meteorological conditions are felt even more than in the plain, especially with regard to precocious emergence. I need only mention the example of *Parnassius mnemosyne*, which in 1918 was found very abundantly by Querci at the end of June and at the beginning of July at Bolognola, whilst in 1913 only a few old individuals had been found, and the inhabitants of that locality assured him that the species had emerged in great quantities at the end of May and at the beginning of June, which in that year were exceptionally mild.

NOTES ON THE EFFECTS OF LATITUDE.

Above all, one can repeat in a general way what has been said with regard to altitude, namely, that, taking into account the number of broods, the differences between the different latitudes are much less than might appear at first sight. The data offered by entomological literature are very vague and confused, and those of Southern Europe almost *nil* with regard to the trigenerate species, because the two summer broods have always been treated as a single one, or on the contrary as an indefinite series of overlapping emergences. I will limit myself, therefore, to a few observations on the material collected from April 20th to June 20th, 1918, by the Querci family at S. Martino delle Scale, in Sicily, which is a good example of one of the least elevated latitudes in Europe, and on the very exact indications which the English entomologists have furnished about their own country, which is an example

of the highest latitudes and of the extreme limits in which various bigenerate and trigenerate species exist and produce more than one annual cycle.

It might be objected that S. Martino is 700 m. high, and that at that height emergences might differ less from the northern ones than is the case in the Sicilian plain. This difference, however, between plain and hills is reduced to a fortnight, which is not surprising, because already in Tuscany it is very small at that height, and because as one proceeds further south the effect of altitude, as we have seen, always tends to diminish.

Let us note, therefore, that at S. Martino the first brood of the trigenerates is seen to extinguish itself at the same epoch as in Florence, except *croceus*, already extinguished on April 20th, instead of being prolonged into May. The second brood of this last as well as that of *daplidice*, emerges from May 5th to June 20th, rather than respectively from the end and from the middle of June to the middle of July, as in Florence. Of *phlaeas* and *brassicae* the second brood has been collected at the same epoch as in Florence; of *rapae* it had not yet appeared on June 20th, from which it would seem later than in Florence, and this need not surprise us, because the first brood was more abundant in May than at Florence, where it chiefly emerges in April and very sporadically in May. Also in the case of the following species the second brood had not appeared on June 20th; there is no doubt that they emerge at the same epoch as in Florence, a little after this date, because Ragusa says of some of them that the "summer" brood begins in June: *medon*, *cleopatra*, *machaon*, and *podalirius*. Of the bigenerate species, *pamphilus* and *cardui* emerge until June 20th; the first always has the characteristics of the first brood; it follows that its second brood does not commence certainly sooner than in Tuscany. The second brood of *icarus* has instead appeared since June 10th instead of at the end of the month. Of the annual species *atalanta* has appeared fresh during the first days of May instead of at the end; *jurtina* is in advance with regard to Florence, and it is an entire month in advance, because the ♂ begins on May 12th and the ♀ on the 23rd; the others emerge contemporaneously with Florence: *minimus*, *rubi*, *crameri*, *cardamines*, *crataegi*, *ida*, *galathea*, *cinavia*, and *didyma*; the last, however, ceased to emerge on June 10th, whilst at Florence it lasts till July 20th. Unfortunately precise data are wanting as to the third broods, but, as Ragusa alludes to various trigenerates in August, September, and October, and we have seen that the first two broods correspond with the greatest exactitude to the Tuscan ones, it is to be presumed that the brood corresponds equally, or is somewhat delayed by a more prolonged "summer pause."

It is not yet possible to follow the behaviour of all the species with regard to the increase of latitude because the data concerning the trigenerates, which are naturally the most interesting, do not distinguish accurately between the two summer broods, which are nearly always confused into one only. We cannot, therefore, decide at what latitude their restriction really happens. This must be very different in the different species; it is enough to say that *phlaeas* and *aegeria* emerge three times a year and at the same epochs from Sicily to central England, and that *rhanni* instead has only one brood all over England. The other trigenerates have two broods in the greater part of Central

Europe as far as England, which emerge contemporaneously with those of the bigenerates: the first from April to June (according to the locality and the years, which are more variable than in the south), and the second, often very partial, from the end of July to the beginning of September. *Brassicæ* generally follows this rule, but in very favourable years produces a third brood, which is abundant when the second brood has emerged precociously from the end of June to the beginning of July. Sporadic individuals of various species are frequently seen in October, but it is the case of precocious autumnal individuals of the first brood, which do not constitute in the British Isles a third brood, as in analogous cases they do not constitute a fourth brood in Italy.

Brassicæ offers, on the contrary, in England a good example of the true transformation of a trigenerate into a bigenerate, which gradually shows itself in more or less favourable years. This recalls the analogous phenomenon produced by altitude observed in the Alps, and contrasts with the phenomenon of simple "suppression" of one brood, without changing the epoch of the others, which happens in some localities and years in peninsular Italy. To suppression is generally to be attributed the missing emergence of the second brood of *machaon* in England. It is already constantly reduced to two broods, but in the colder summers the second brood is missing altogether; in those less cold a greater or lesser number of individuals complete a summer cycle, and their progeny succeeds in becoming chrysalids in time to winter with the remainder of the spring generation. This division of families into a group of rapid development and into one of slower development, which leaps over a brood, has been frequently observed in nearly all the species by the entomologists of northern countries, and there is no doubt that it happens also very often in the south, where it explains also partial and suppressed broods.

The bigenerates of the South of Europe nearly all remain such up to the latitude of central England, simply reducing the length of their epoch of emergence, which are identical with those above recorded for the two northern broods of the triple-brooded. Only *polychloros* is already reduced to one single annual cycle in the whole of the British Isles. The fact is worth noting that on the contrary *urticæ* succeeds in very mild autumns in producing a small number of individuals in October, because some of those of the brood of August-September, instead of preparing to winter, copulate and produce progeny; thus the third partial extraordinary brood winters consequently together with the second brood, and together with a few individuals from the first brood of June, who retire to winter and fall into lethargy for ten months until the following April. All this shows what an extraordinary power of adaptability, and what great resources, are possessed by Lepidoptera to adapt themselves to different meteorological conditions and to survive even sudden changes, which to them must be catastrophic!

In England the annual species follow the same rules as those mentioned with regard to altitude: the spring species emerge every year according to the climatic conditions, owing to which a precocious species like *cardamines* can be delayed until June when the winter is prolonged, or *crataegi* until July; the species proper to June in Italy emerge normally in July or at the beginning of August; the species of

July and August emerge exactly at the same epoch from England to the South of Europe.

Finally let us remark that at higher latitudes than that of central England, all the bigenerates and trigenerates become annual, emerging, according to the usual law of such real transformations, at an epoch intermediate between those of the broods, where two exist. Bearing in mind also that the transformation from triple-brooded into double-brooded takes place through the substitution of one emergence only for the two summer emergences between the epoch of the second and that of the third, it is possible to have a synthetic conception of the broods with regard to the latitude. We have already alluded to the fact that some bigenerate and trigenerate species remain such in all regions whilst others diminish their annual cycles precociously with the increase of latitude. It remains to establish where the transformations of each species occur, bearing in mind that we are not, however, to expect the number of broods always to decrease northwardly, as intense summer heat and drought are just as apt to suppress them as the winter cold, or at least to reduce one brood to an extremely small number of individuals. For instance, not a single individual of *H. lucina** or of *M. cinxia* has, to my knowledge, ever been observed to emerge during the summer in central or northern Italy, whereas it is well known that a partial second brood of the former is often produced from England to Switzerland, and that the second brood of the latter from Switzerland and the south of France has even been described and named. Never does *urticae* produce more than two broods in central Italy, and in the plain probably not more than one, whereas in England it may even produce an exceptional third one, as I have mentioned. Each species evidently has an "optimum" latitude, where all the broods are abundant.

Notes and Observations on the Lepidoptera of the Witley District from 1912 to 1919.

By AUSTIN A. TULLETT, F.E.S.

(Concluded from page 93.)

Brephos parthenias, L.—Common in March and April flying in sunshine around sallows. Three taken on a fence, April, 1918.

GEOMETRIDÆ.—Sub-family *Geometrinae*,

Pseudoterpna pruinata, Hufn.—Common on Hambledon Common in July.

Geometra papilionaria, L.—A series of seventeen, mostly from larvæ obtained on alder in April, May and June (Hambledon and Chiddingfold.) Larvæ from this district will not eat birch in confinement. There is plenty of birch growing in the vicinity and even close where the alder grows.

Geometra vernaria, Hb.—Two, Witley, July 12th, 1912. Taken at light.

Euchloris pustulata, Hufn.—Very common at dusk in June and July in Hambledon Woods.

Iodis lactearia, L.—Common in June in Hambledon Woods.

* Dr. Christ took it at Lecco in Aug., 1879, and Miss Fountaine at Olgiate in Sept., 1893 (See my "Butt. of Switz., etc.," p. 51.)—G.W.

Hemithea strigata, Mull.—Common at dusk, and can be beaten from hedges in June and July at Hambledon Woods. Larvæ beaten fully grown from hawthorn in May, 1918, in Hambledon Woods.

GEOMETRIDÆ.—Sub-family *Acidaliinae*.

Ptychopoda (Acidalia) virgularia, Hb.—One, May. One, April, 1913. One, June 25th. Three, July, 1912.

Ptychopoda (A.) straminata, Tr.—One, July, 1912. Two, July 26th, 1917, L. B. Prout.

Ptychopoda (A.) interjectaria, Bdv.—One, Witley, June, 1919.

Ptychopoda (A.) subsericeata, Vw.—Eleven, taken at dusk near Chiddingfold, in June, 1919.

Ptychopoda (A.) inornata, Hw.—One, July, 1912. One, July 16th, 1918.

Ptychopoda (A.) aversata, L.—Common in Witley district in June and July.

Ptychopoda (A.) bisetata, Hufn.—Common generally in the district in July.

Ptychopoda (A.) dimidiata, Hufn.—Ten, July, Witley. One, June, Witley. Beaten out of bramble bushes.

Ptychopoda (A.) trigeminata, Hw.—Not common. Three on June 26th, 1918; beaten out of bramble bushes.

Leptomeris (Acidalia) remutaria, Hb.—Very common in the woods in May. Larvæ to be found commonly on Sallow, July to September.

Leptomeris (Acidalia) imitaria, Hb.—Not uncommon in the hedges and woods in June and July.

Ania emarginata, L.—Two, July, 1912. One, July, 1919, beaten out of bushes.

Timandra amata, L.—Common in Hambledon district in June and July.

Ephyra porata, F.—Three, August. Five, June. One, September. Three, May. Beaten out of bushes or found on tree-trunks in Hambledon Woods.

Ephyra punctaria, L.—Seven, May. Two, June. Beaten from bushes or taken from tree-trunks in Hambledon district.

Ephyra linearia, Hb.—One, Witley, June 2nd, 1912. Not common here.

Ephyra annulata, Schulze.—Five, May. Four, June, Witley. One, July. Beaten out of bushes in Hambledon district.

Cosymbia (Ephyra) pendularia, Cl.—Five, May. Two, June, Witley.

Sub-family *Hydriomeninae*.

Ortholitha plumbaria, F.—One, June 21st. One, June, 1912, taken on Hambledon Common; beaten out of heather.

Ortholitha limitata, Scop.—Common in July in meadows during the day.

Minoa murinata, Scop.—Two, June, 1918. "The Hill," Lower Woods, beaten out of brambles. Seven, May, 1919, Chiddingfold Woods.

Odezia atrata, L.—One, Witley, September, 1913.

Anaitis plagia, L.—Not uncommon in May and June in Hambledon Woods.

- Chesias partata*, Fuesl.—One, Witley, October 15th, 1911.
- Tricopteryx (Lobophora) carpinata*, Bkh.—Not uncommon on fences in April and May.
- Tricopteryx rivetata*, Hb.—Two, May, 1919. One, June. Taken on pine trees opposite "The Hill."
- Lobophora halterata*, Hufn.—Two, May, 1919. At dusk in fields near Hambledon Church. L. B. Prout.
- Mysticopteryx (Lobophora) sexalisata*, Hb.—Rare. One, near Hambledon, 10th June, 1919. Mr. H. Smith.
- Cheimatobia brumata*, L.—Common in November at ivy. Taken in December on fences.
- Cheimatobia boreata*, Hb.—Common at ivy and on fences in November and December.
- Triphosa dubitata*, L.—One, April 15th, 1912. One, October 15th, 1911. One, July 30th, 1914.
- Eucosmia certata*, Hb.—One, May 3rd, 1919. Taken while resting on Museum outer door 2 p.m. Rare.
- Eucosmia undulata*, L.—Common on bilberry opposite "The Hill," July, 1912, but has not turned up so frequently since.
- Eustroma silaceata*, Hb.—Not uncommon in May and June on tree trunks, and was also beaten out of bushes.
- Lygris prunata*, L.—One, Witley, July 12th, 1912.
- Lygris testata*, L.—Five, 27th August, 1918. Chiddingfold. Specimens from Northumberland agree very well with these.
- Lygris populata*, L.—Three, August. Two, September, 1913.
- Lygris associata*, Bkh.—Three, June. Three, July, 1913. One, May, 1919. Chiddingfold, beaten from bushes.
- Cidaria pyraliata*, Hb.—Not uncommon.
- Cidaria corylata*, Thun.—Not uncommon on pine-tree trunks opposite "The Hill," May and June.
- Cidaria fulvata*, Forst.—A series of twenty-two in June, 1914.
- Cidaria truncata*, Hufn.—Not uncommon on tree trunks or at light. May and June. Three specimens taken in September.
- Cidaria citrata (immanata)*, Hw.—Not uncommon in July, August and September; beaten from bushes.
- Thera obeliscata*, Hb.—Not uncommon on pine trunks in May and June.
- Thera variata*, Schiff.—Not uncommon in May and June on pine trees.
- Thera firmata*, Hb.—Three, June, 1913. One, September, 1912.
- Lampropteryx suffumata*, Hb.—One, April, 1913. Two, May. One, female, June 13th, 1919. Four eggs obtained and three larvæ reared to pupal stage by L. B. Prout.
- Ochyria (Coremia) unidentaria*, Hw.—Common May and June and again in August and September, by beating from bushes.
- Ochyria (Coremia) ferrugata*, Cl.—Common in May and June.
- Ochyria (Coremia) designata*, Rott.—Not uncommon in May and June; slightly variable.
- Amoebe viridaria*, F.—Not uncommon in June and July.
- Malenydris multistrigaria*, Hw.—One, March, 1913, Witley.
- Malenydris didymata*, L.—Not uncommon in Hambledon Woods, June and July.
- Oporabia dilutata*, Bkh.—Not uncommon at ivy bloom and on fences, etc. Late October and November.
- Oporabia autumnata*, Bkh.—Three, November, 1918, at ivy bloom.

Taken at same time as *O. dilutata*, but not so plentiful as latter.

Xanthorhoë montanata, Schiff.—Very common everywhere in June.

Xanthorhoë fluctuata, L.—Very common in May and June.

Xanthorhoë sociata, Bkh.—Very common near Hambledon in May and June, and occurs again in August and September, but not so plentiful. Very variable in this district. One male, May, 1919, with central band very narrow. Two females, May, 1919, with grey-greenish extra wide band, and hindwing not so heavily marked. The small white band in outer greyish area not so prominent as in typical specimens. One female, May, 1919, approaching *ab. obscurata*.

Xanthorhoë unangulata, Hw.—One, June. One, August, 1919.

Euphyia picata, Hb.—One, June 12th, 1912. One, June 13th, 1918. Two, June, 1919, taken by Mr. Prout at dusk in fields near Hambledon.

Eulype hastata, L.—Not uncommon in May and June. A high flier. A fine female with the black markings reduced, and the white much clearer than in typical specimens, May, 1919. This appears to be the rarer form from this district.

Mesoleuca albicillata, L.—Common in June and July in Witley district on tree trunks, and at light, etc.

Mesoleuca bicolorata, Hufn.—One, Hambledon, July 10th, 1919, W. H. Smith.

Mesoleuca ocellata, L.—Not uncommon in May and June on tree trunks, and beaten out of hedges.

Perizoma affinitata, Stph.—Not common. Three, May, 1912. Four, June, 1913.

Perizoma alchemillata, L.—One, July 10th, 1912. One, June 4th, 1918, Chiddingfold.

Perizoma flavofasciata, Thun.—Not uncommon near Hambledon and Chiddingfold in May and June.

Perizoma albulata, Schiff.—Very common during May and June in meadows near Chiddingfold.

Camptogramma bilineata, L.—Very common in June and July.

Hydriomena impluviata, Hb.—One, May, 1912. Four, June. One, July, 1919.

Anticlea badiata, Hb.—Not uncommon on fences and tree-trunks, in March and April.

Anticlea nigrofasciaria, Gz.—Common on fences and tree-trunks in April, and flying at dusk.

Euchoeca oblitterata, Hufn.—Not uncommon in Chiddingfold Woods near the alders in late May and June and early July.

Asthena candidata, Schiff.—Occurs more or less frequently in Chiddingfold Woods in May and June.

Asthena luteata, Schiff.—One, June, 1912. Three, June 4th. Two, June 26th, 1919. One, July 2nd, beaten out of brambles in "The Hill" lower woods.

Eupithecia oblongata, Thun.—Two, July. Two, August, 1912.

Eupithecia pulchellata, Stph.—One, May. One, July, 1912. Six, May 28th, 1919, from larvæ bred by L. B. Prout. Twenty-five larvæ obtained near Hambledon in July, 1918, six emerged and the remainder were parasitised.

- Eupithecia pusillata*, F.—Five, May 15th-17th, 1918.
Eupithecia indigata, Hb.—Four, May, 1919.
Eupithecia expallidata, Gn.—Five, bred July, 1919, by L. B. Prout, from larvæ found on golden-rod in Chiddingfold district, September, 1918.
Eupithecia assimilata, Gn.—Four, May, 1912. One, September, 1913, Witley.
Eupithecia absinthiata, Cl.—One, May 6th. Two, June 29th. One, July 9th, 1919. Bred from larvæ on golden-rod at Chiddingfold. September, 1918.
Eupithecia albipunctata, Hw.—One, April. Thirteen, May, 1919. Bred from larvæ on angelica in September, 1918, Witley, L. B. Prout.
Eupithecia vulgata, Hw.—Not uncommon in April and May on tree trunks and fences, etc. Also beaten from bushes.
Eupithecia lariciata, Frr.—One, May 27th, 1918.
Eupithecia castigata, Hb.—Not uncommon in May and June.
Eupithecia satyrata, Hb.—One, May 27th. One, June 4th, 1919.
Eupithecia subfulvata, Hw.—Seventeen, bred by Mr. Prout from larvæ on yarrow, September and October, 1918.
Eupithecia haworthiata, Stt.—One, June 12th, 1912.
Eupithecia plumbeolata, Hw.—One, from Woods near Chiddingfold, May, 1919.
Eupithecia tenuiata, Hb.—One, June 28th, 1918.
Eupithecia sobrinata, Hb.—Three, Witley, July, 1912.
Eupithecia abbreviata, Steph.—Common on fences and tree trunks in April and May.
Eupithecia nanata, Hb.—Very plentiful on Hambledon Common at dusk in May.
Perenoptilota fluviata, Hb.—One, June. Two, July, 1912.
Chloroclystis coronata, Hb.—Seven, May, 1918, beaten from brambles, "The Hill" lower woods.
Chloroclystis rectangulata, L.—Ten, June, Witley, on fences, etc.
Gymnoscelis pumilata, Hb.—One, March. Four, April. Four, June. Two, July, 1912.

Sub-family *Boarmiinae*.

- Lomasipilis marginata*, L.—Common. May, June and July in Chiddingfold District. *Ab. pollutaria*, Hb. One, July 4th, 1912. One, June, 1919.
Ligdia adustata, Schiff.—One, June, 1912.
Bapta bimaculata, F.—One, May 22nd. One, June 17th, 1919. Beaten from brambles in "The Hill" lower woods.
Bapta temerata, Hb.—Two, May, 1912. One, May 20th, 1919, taken off tree-trunk at "The Hill." Six, June.
Cabera pusaria, L.—Common in May, June and August. Larvæ plentiful on alder in July and September.
Cabera exanthemata, Scop.—Common in May, June and July. Larvæ common on alder July to September.
Numeria pulveraria, L.—Three, May, 1912. One, June, 1914. One, June, 1919. Not common. Taken in pine wood.
Ellopiia prosapiaria, L.—Common in pine wood on tree trunks during day, in June.

- Metrocampa margaritaria*, L.—Fairly common in Hambledon and Chiddingfold Woods. June and July.
- Ennomos alniaria*, L.—One, September 15th, 1912.
- Selenia bilunaria*, Esp.—First brood more or less common in March and April on fences, tree-trunks, etc. Second brood at light in July.
- Hygrochroa syringaria*, L.—Not uncommon in Hambledon Woods. Late June and July at dusk.
- Gonodontis bidentata*, Cl.—Fairly common in June and July on fences and tree-trunks.
- Selenia tetralunaria*, Hufn.—One, July 22nd, 1912.
- Himera pennaria*, L.—Five males, November, 1911. Four females, November, 1919, bred from larvæ taken at Chiddingfold Woods, June, 1919.
- Crocallis elinguaris*, L.—Two, August. Two, July, 1912. One female, July, from larvæ taken at Chiddingfold, April, 1919.
- Angerona prunaria*, L.—Very common in Hambledon Woods in June; some good vars. taken, one exceedingly dark male and also mottled forms; one banded male taken July 2nd, 1918, and one in June, 1919.—A.A.T.
- Ourapteryx sambucaria*, L.—Quite common in July at dusk and at light.
- Eurymene dolabraria*, L.—Not common. One, May, 1912. One, June, 1913. One, June, one, July, 1914.
- Opisthograptis luteolata*, L.—Very common in May, June and August.
- Epione advenaria*, Hb.—Common on bilberry in May and June.
- Venilia maculata*, L.—Very common in most woods in the district in May and June.
- Semiothisa liturata*, Cl.—Plentiful in pine wood in May, June and July.
- Hybernia leucophaearia*, Schiff.—Males abundant on fences in February, females are scarce on fences, but can be obtained by beating oak trees bearing old leaves. Males are very variable. Larvæ common on oak in April and May.
- Hybernia aurantiaria*, Esp.—Not uncommon on fences and also at ivy. November.
- Hybernia marginaria*, Bkh.—Very common on fences and tree trunks in February and March. Larvæ common on oak in April and May.
- Hybernia defoliaria*, Cl.—Males and females abundant on fences and tree trunks. Males are very variable November, December, January and February. Most common in December and January. Larvæ plentiful on oak in May.
- Anisopteryx aescularia*, Schiff.—Not plentiful, but can be taken on fences and tree trunks in February, March and April.
- Phigalia pedaria*, F.—Males were abundant in January and February, 1918, on fences. One melanic male was taken by Mr. Joicey February 11th, 1918. Four females, February, 1918. Larva common on oak in May.
- Apocheima hispidaria*, F.—One male, March 5th, 1918, on fence. Four males, March 20th, 1919, on fence.—A.A.T.
- Pachys strataria*, Hufn.—One, March, 1912. One, April, 1918.
- Pachys betularia*, L.—One, May, 1913. One, June 13th, 1918.
- Hemerophila abruptaria*, Thunbg.—Not uncommon on fences in May.

- Boarmia gemmaria*, Brahm.—Not uncommon at light in July and August. Occasionally taken on fences.
- Boarmia abietaria*, Hb.—Two, July 7th, 1918, on a fence.
- Boarmia repandata*, L.—Common in June and July.
- Boarmia roboraria*, Schiff.—Not common. Seven, June. Two, July. Hambledon Woods.
- Boarmia consortaria*, F.—Not uncommon in May and June in Hambledon Woods.
- Tephrosia bistortata*, Gz.—1st brood extremely common on fences and tree trunks in February, March and April. 2nd brood common in May and June, much smaller than 1st brood. Larvæ very common on oak, etc. 2nd brood July 11th, 1919. One male taken February 4th, 1920, on fence. Very early appearance, can find no other record of this species so early.—A.A.T.
- Tephrosia luridata*, Bkh.—Not uncommon on fences in June and July.
- Tephrosia consonaria*, Hb.—Not uncommon in May and June. Turned up plentifully in 1919.
- Tephrosia crepuscularia*, Hb.—Not common, a series of seventeen from Witley, mostly from a fence.
- Tephrosia punctularia*, Hb.—Common on Birch trees and fences in May.
- Gnophos obscuraria*, Hb.—One, Witley, August 2nd, 1912.
- Pachytenema hippocastanaria*, Hb.—1st brood plentiful on Hambledon Common on heather, in May. 2nd brood plentiful in July. A series of fifteen taken May 20th, 1919.
- Ematurga atomaria*, L.—Very plentiful on Hambledon Common in May and June. We have one male taken in April.
- Bupalus piniaria*, L.—Plentiful in pine woods opposite "The Hill," in May and June.
- Thamnonoma vauaria*, L.—A series of sixteen bred from larvæ found on currants and gooseberry foliage, May and June; emerged June, 1919. Not uncommon in July in the fruit garden at "The Hill."
- Lozogramma petraria*, Hb.—Very common in the district wherever bracken occurs. May and June.
- Chiasmia clathrata*, L.—One, May, 1912. One, August 10th, 1912.
- Perconia strigillaria*, Hb.—Not uncommon on the heaths in June, including ab. *grisearia*, Stgr.

ZYGÆNIDÆ.

- Zygæna trifolii*, Esp.—Abundant in certain meadows. Typical form, very common. Ab. *orobi*, Hb., common. Ab. *extrema*, Tutt. One taken by Mr. Joicey, June 13th, 1919. Ab. *minoides*, Selys. Four taken June 13th, 1918. One, June, 1919. Ab. *glycirrhizæ*, Hb. One, June 7th, 1918.
- Zygæna filipendulæ*, L.—Typical form. Plentiful in meadows.

COSSIDÆ.

- Cossus cossus*, L.—One, May, 1913. Bred from larva brought in by a boy, 1912. Larva pupated in sawdust. One, June, 1913. One, 1915.

SESIDÆ.

- Sesia sphecoformis*, Gerning.—One, June 14th, 1918. Six, June 20th,

1919. Taken in the afternoon flying round buckthorn bush. Miss N. and Mr. L. B. Prout.

HEPIALIDÆ.

Hepialus humuli, L.—Plentiful at dusk in most meadows. June and July.

Hepialus sylvina, L.—Four males, August. One female, September, 1912.

Hepialus lupulina, L.—Plentiful at dusk in most meadows. Late May and June. Also found on fences.

Hepialus hecta, L.—Abundant at dusk in June anywhere that bracken grows.

The record of the following species has been supplied by Mr. Oldaker since the publication of his List in 1913:—

Agriades coridon, Pod.—Recorded from Chiddingfold, 1911. E. G. R. Walters. And Witley, 1905.

Petilampa arcuosa, Hw.—Witley Common, 1910. E. G. R. Walters.

Taeniacampa opima, Hb.—Witley. April 11th, 1916. G. E. Eastwood.

Catymnia difinis, L.—Witley Common, 1911-1912. E. G. R. Walters.

Tholomiges turfosalis, W.R.—Witley Common, 1912. E. G. R. Walters.

Eupithecia subnotata, Hb.—Witley, 1910. E. G. R. Walters.

Phibalapteryx tersata, Hb.—Wormley, 1910. E. G. R. Walters.

The Swiss species of the Genus *Hesperia*.

By B. C. S. WARREN, F.E.S.

(Continued from page 88.)

H. andromedæ, Wallengren.

Andromedæ has acquired the reputation of being one of the rarest Central European *Hesperias*. This reputation has been gained by false pretences; and is quite undeserved. In any Alpine locality where I have collected, in the cantons of Vaud, Valais, Bern, and Grisons, I have found *andromedæ* to be much more widely distributed than such species as *serratulæ*, *alveus* and *cacaliae*. *Andromedæ* has a great range in altitude, and may be found on the wing from the end of May onwards, according to the height. The idea that July is the month to look for *andromedæ* is probably the principal factor that has helped to maintain the species' reputation for rareness. The vertical range of *andromedæ* probably exceeds that of any other species, and is far greater than that of any of the other three purely Alpine *Hesperias*, i.e., *carlinae*, *cacaliae*, and *ryfféleusis*. *Andromedæ* may be found from 3700 ft. to over 9000 ft. and very likely higher. I have taken it near Caux at 3700 ft. and at Kandersteg at 3850 ft., while in the Ueschinen Tal (also near Kandersteg), where it is unusually plentiful, it occurs from just 4000 ft.

The duration of the period of flight of *andromedæ* is, like that of *alveus*, most uncertain; and the emergence irregular. It is one of the first Alpine *Hesperias* to emerge, I have taken it on May 23rd near Kandersteg, and it is not unlikely that in an advanced season it would be found even before this. At higher levels it is proportionately later,

but not as much as might be expected. I have taken it at 5200 ft. on June 6th (Bernese Oberland), and over 5200 ft. on June 8th, slightly worn (Grisons), and over 6000 ft. on June 24th (Bernese Oberland).

If one was to draw conclusions from the results of a short visit at a given altitude, one would probably conclude that the duration of flight was very short; whereas, it is in reality of considerable length. The individuals themselves wear very badly, and scarcely a week after the first emergence of the species, worn specimens are to be found. This, together with the fact that only a few specimens will most likely be seen in a day (except in a very favourable locality), gives the impression that the insect is nearly over. It is, however, only the result of the irregular emergence; fresh specimens may continue to appear throughout a period of as much as eight weeks. The following dates illustrate this, and notes from other localities give the same results.

In a marsh near Kandersteg I took a fresh ♂ on May 25th a few more on the 27th and 31st, several on June 2nd and 3rd, some a little worn; no more until June 29th (worn), and on July 3rd another fresh specimen, and again on July 8th, also fresh, the last I found in this locality. Throughout this period, May 25th to July 8th, I visited the locality almost daily. Again, from the Ueschinen Tal, when *andromedae* was more abundant than is usual, I have notes on its emergence at altitudes between 4000 and 7000 ft. The following dates apply to one locality, no part of which was below 4600 ft. or above 5200 ft. First seen, May 23rd; June 6th, common, both sexes; June 8th, some worn; June 13th, worn; June 19th, only one quite fresh; June 24th, abundant, fresh and worn; July 2nd, a few very worn; July 6th, one worn; 7th, none; 9th, none; 13th, none; 15th and 16th, a few fresh and worn; 19th, one a little worn; 20th, one fairly fresh; and 21st and 22nd, one each day, both worn; the latter being the last time I visited the locality. Had I left on the 15th, without having seen a single *andromedae* for eight days, considering it had already been on the wing for six weeks, I should naturally have concluded it was over. At that date, too (July 15th) it was abundant 1400 ft. above the ground when I made these notes. I regret that I was unable to remain longer and note when the species finally disappeared, but it is not likely it can have lasted much longer. The latest date I have noted, at a similar altitude, was August 2nd. This was at Lenzerheide, where it appeared at the commencement of the season a little later, so one cannot assume that in the Ueschinen Tal *andromedae* would have survived until August. In the neighbourhood of Lenzerheide it was more abundant than I have ever seen it elsewhere. It would often have been possible to take two or three dozen specimens in one morning had one wished to do so.

Andromedae is very strong on the wing, and restless; seldom remaining long on the same spot. It is very fond, like most *Hesperiidae*, of settling on moist patches of ground, and even on stones in the middle of a rushing mountain stream. This is a remarkable habit, which I have not observed in any other species. In the Schwarzbach on the Gemmi Pass, I frequently saw *andromedae* alight and settle on stones in the middle of the stream; in some instances the stone selected being scarcely raised an inch above the surface of the water. It is never to be found far from water, and often inhabits very barren areas in the

mountains; flying up and down the edge of precipitous torrents, where its only Lepidopterous companions are a few small moths. One may walk for hours over a rhododendron-covered Alp, where *cacaliae* and numerous other species of Alpine butterflies abound, and if there is no water about, never see *andromedae*; but on coming to a little stream, or even a small pool, such as is frequently seen in districts where there are many cattle, a few moments search will almost certainly disclose it. I have experienced this many times, and have often gone considerable distances out of my way to verify the fact. It requires, however, a certain amount of practice to catch, or even mark with the eye, this lively species in such localities.

Andromedae is a very distinctly marked species, and is not one which the collector is ever likely to find difficult to name; but, I believe the feature most usually trusted to for identifying the species is the presence of the three small white lines, nearest the base, on the inner margin of the forewing upperside. Now this character when taken in connection with the formation of the median band underside hindwing, gives a combination of markings characteristic of *andromedae*, but has this drawback, the three white lines are, not infrequently, wanting, or reduced to two or one. In such cases, anyone wholly dependent on these marks would probably record the species as *cacaliae*. The underside hindwing, however, offers a sure means of identification. The two light spots next the inner margin form a more or less perfectly shaped exclamation mark, on a dark ground. This is found in no other species (see notes on *cacaliae*) and with the characters of the group makes the species unmistakeable.

Andromedae is not a very variable species, such variation as I have observed being principally the result of enlargement of the white markings of the underside. The only aberrations of the upperside I have seen are a tendency to a great increase of grey scaling, giving the species an almost silver appearance; and the aberration already mentioned in which the white lines on the inner margin of the forewing are wanting. The extreme form is rare, I have seen about a dozen, but transitional ones, with only one or two lines present, are of frequent occurrence.

Of underside aberrational forms the commonest is that in which the two spots of the exclamation mark are joined, owing to the elongation of the basal one, they never, however, lose their characteristic shape; nor, therefore, their value as a distinguishing character. This aberration is found in both sexes.

An apparently very rare form (in my Swiss series of about a hundred specimens there is only one, and I have never seen a second) is that in which the costal basal spot is practically joined to the costal spot of the median band. I have only noted a tendency to this form of variation in one other species, namely *serratulae*. In my specimen the spots do not absolutely meet, but they so nearly do so, that it is probable that very rarely one would find a specimen in which they do. In another rare aberration, we find the central spot of the median band joined to the costal basal one. The extreme form of this is usually accompanied by the union of the two spots of the exclamation mark; transitional forms, with the central spot of the band considerably extended towards the basal spots, are fairly common.

The var. *reducta* is found in several degrees; the extreme aberration

tion in which the inner edge of the central spot is level and in a line with the rest of the band, is very rare. Specimens with the projection so modified as to be of less than half its normal size, are much commoner. None of the aberrations mentioned, however, make the identity of the species the least doubtful.

H. cacaliae, Rbr.

Cacaliae is one of the true Alpine species; in fact, excepting *ryffelenensis*, it is more completely confined to high altitudes than any other Central European species. It is most frequently recorded from altitudes over 6000 ft., where it is well distributed and normally abundant. It ascends to very great altitudes, possibly higher even than *andromedae*, but cannot apparently establish itself in sub-alpine regions, as does that latter, which is undoubtedly most abundant between 4000 and 6000 ft. *Cacaliae* is occasionally recorded at low levels, but these records are not satisfactory, and I strongly suspect are based on the capture of single examples, which have strayed from higher levels. I have myself taken such isolated examples in the Ueschinen Tal. In this valley above 6000 ft. *cacaliae* is common; but I found a ♂ at 4500 ft. and a ♀ at the same level a month later. I had collected on this ground continually between the two captures without finding another specimen, so concluded they were the result of eggs laid by a ♀ strayed from higher up the summer before. In such a case there would, of course, have been a considerable number of eggs laid, and the fact that only two specimens were found, suggests that conditions at these lower levels are unsuitable to the species. I should add that when I found the first specimen, the ♂, the species had not yet emerged higher up. In most sub-alpine regions, particularly if surrounded by mountains of greater height, it is not unusual to take single specimens of Alpine butterflies, and *cacaliae*, with its wild flight, would seem a likely enough species to stray from its natural zone.

Cacaliae is not at all so universally distributed in the Swiss Alps as *andromedae*, but, when it occurs it is usually much more abundant. I have found it in many localities in the Valais, Bernese Oberland, and Grisons; but not in the Vaud, though it is probably found in some of the higher parts.

Cacaliae is a very distinctly marked species. It varies, however, to a considerable extent, and thus sometimes assumes a certain likeness to *andromedae*. This is particularly the case when the two spots next the inner margin hindwing underside take the same shape as the exclamation mark in *andromedae*. They can, however, always be easily separated, for in *andromedae* the exclamation mark is always on a black background; while in *cacaliae* it is on a coloured one. In other words, the black coloration which borders the hindwing from the base to the anal angle, is twice the width in *andromedae* it is in *cacaliae*. Another feature which distinguishes *cacaliae* from all other species, is the bright brownish-orange colour of the hindwing underside. More valuable than the colour, which unfortunately fades a little in worn examples, is the character offered by the basal spots, underside hindwing. Normally three in number in all other species, in *cacaliae* the central one is almost always absent; only on rare occasions it is partly developed, and never, in my experience, wholly.

On the upperside *cacaliae* shows a greater degree of transitional

variation than any other species of the group; the white markings being often completely absent, and often as strongly developed as in *andromedae*; while any number of intermediate forms exist. The heaviest development of the white markings is the rarest, and is principally, if not entirely, confined to the ♀s. The other extreme, which is much commoner, is found in both sexes. On the underside the costal basal spot of the hindwing is the most variable feature; sometimes being rounded as in *serratulæ*, and sometimes square as in *alveus*.

Many interesting aberrations of the *reducta* form occur, to the extreme form with the inner edge of the band absolutely rectilinear, which is rare. Transitional forms, in which the formation of the central spot is considerably altered, are fairly common.

(To be continued.)

CURRENT NOTES AND SHORT NOTICES.

The volume of the Ray Society for 1919, *British Orthoptera* by W. J. Lucas has now been issued.

In the *Rev. Mens. Namur.* for February is an interesting obituary of M. l'abbé Léon de Joannis, the brother of l'abbé Joseph de Joannis, an ex-president of the Entomological Society of France. For more than thirty years M. L. de Joannis had devoted himself to the rearing of larvæ.

In the *Ann. Soc. Ent. Belg.* for February M. J. Bondroit gives a series of notes on the "Ants of France and Belgium," which our colleague, Mr. Donisthorpe, and others have noticed so adversely, and attempts to answer some of the strong criticisms advanced in several letters written to him by the eminent Belgian myrmecologist, M. Emery. The number also contains the Annual Address read by the President, M. Lameere, who took for his subject the life and work of their last President, M. Charles Kerremans, who died in 1915 during the occupation.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

February 26th, 1920.—NEW MEMBERS.—Mr. F. Lindeman, of Sao Paulo, Brazil, and Mr. S. Abbott, of Catford, were elected members.

EXHIBITION OF LANTERN SLIDES.—Mr. W. T. Lucas, Oxshott before and after "devastation" caused by the cutting of the trees.

Mr. Main, illustrating details of the Life-histories of the beetles *Lytta vesicatoria*, *Cetonia aurata*, *Dorcas parallelepipedus*, *Lucanus cervus*, *Necrophorus humator*, *Nebria brevicollis*, *Pterostichus madidus*, and *Rhagium inquisitor*.

Mr. Bennett, ova of *Chrysopa* sps., resting attitudes, a record of changes of form in the *Amœba* during six minutes, the egg-breaker of the larva of *Stenopsocus cruciatus*, etc.

Mr. Dennis, the plants noted during a holiday on and around Snowden.

Mr. Roberts, various birds, views of Selborne and Folkestone Warren.

VARIATION IN *H. PENNARIA*.—Mr. A. A. W. Buckstone exhibited a long bred and captured series of *Himera pennaria* from various localities, and read notes on the forms included.

XANTHIC *C. PAMPHILUS*.—Mr. Garrett, an extremely pale xanthic example of *Coenonympha pamphilus*, taken at Wicken.

March 11th, 1919.—NEW MEMBER.—Mr. A. C. Jump, of Wandsworth Common, was elected a member.

ABERRATIONS OF BRITISH BUTTERFLIES.—Mr. R. Adkin exhibited aberrations of *Pyrameis atalanta*, yellow instead of red coloration, and of *Vanessa io*, without eyespots on the hindwings.

THECLIDÆ.—Mr. W. J. Kaye, several striking species of South American *Theclidae*.

ABERRATIONS OF *S. SEMELE* AND *P. ÆGON*.—Mr. Barrett, series of *Satyrus semele*, showing much aberration in the spotting of the forewings; a series of *Plebeius ægon* underside aberrations, and of *Polyommatus icarus* undersides.

THE SURREY RACES OF *A. CORIDON*.—Mr. A. W. W. Buckstone, the 1919 specimens of the three forms of *Agriades coridon* from Shere, Surrey, and read notes on these races.

ABERRATIONS OF *P. ICARUS*.—Mr. L. E. Dunster, underside aberrations of *Polyommatus icarus* with ab. *obsoleta* and ab. *icarinus*.

SOME AQUATIC LARVÆ.—Messrs. Blair and H. Main, living larvæ of *Corethra* sp., *Mochlonyx* sp., *Ochlerobatus nemorosus* and *Anopheles bifurcatus* all denizens of water, and made remarks on their habits in captivity.

MELANIC *D. TRUNCATA*.—Mr. P. S. Williams, a bred series of the melanic form of *Dysstroma truncata* from Finchley.

JAMAICAN LEPIDOPTERA.—Mr. Hy. J. Turner, a large number of Lepidoptera taken in the latter part of 1919 in Jamaica by a member, Mr. D. Pearson.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

January 19th, 1920.—NEW MEMBER.—Mr. J. Davis Ward, Limehurst, Grange-over-Sands, was elected a member.

ANNUAL REPORT OF LEPIDOPTERA.—Mr. W. Mansbridge read his report as Recorder for Lepidoptera for 1919. Five species new to the Lancashire and Cheshire List were mentioned, viz., *Nonagria geminipunctata*, Hatchmere; *Depressaria enicella*, bred from sawfly, Formby; *Retinia purdeyi*, Burnley; *Lithocolletis sorbi*, Delamere, Eastham and Woolton; *Elachista magnificella*, Sales Wood, near Prescott. *Crambus uliginosellus*, new to Lancashire, from Holker Moss. In support of the paper, Mr. W. A. Tyerman exhibited a number of his most interesting captures during 1919.

February 16th, 1920.—The evening was devoted to a discussion of the rules of the Society.

EXHIBITS.—Mr. S. Gordon Smith, a case of very fine varieties of *Vanessa io*, *Aglaüs urticae*, *Euvanessa polychloros*, *Apatura iris*, *Aphant-*

opus hyperantus, and *Arctia caia*, many being from the collection of the late Sydney Webb. Mr. W. Mansbridge showed a long series of *Leptogramma literana* and its varieties from the New Forest, and a series of *Elachista magnificella* from near Prescott.

March 15th, 1920.—PAPER.—Mr. F. N. Pierce read a paper entitled "Notes on American Tortrices." In his interesting communication Mr. Pierce described the affinities of a small collection of North American *Tortricidae*, with certain British species, as shown by their genitalia, and exhibited the specimens. If there were any longer doubt as to the value of the genital ancillaries in questions of relationship it would be dispelled by the facts brought forward in the paper. Mr. Pierce conclusively demonstrated that generic, as well as specific limits, could be recognised by a study of this branch of insect morphology. An animated discussion followed the paper.

EXHIBITS.—Spring Lepidoptera were exhibited by Messrs. P. J. Rimmer, W. A. Tyerman, and the Rev. F. M. B. Carr. It was noted that melanism in *Phigalia pedaria* and *Hybernina leucophaearia* seemed to be more marked at Delamere and Eastham than usual. Mr. Wm. Mansbridge brought some curious short-winged specimens of *Coenonympha pamphilus* and *Selenia bilunaria* from Grange and Torquay respectively.

THE ENTOMOLOGICAL SOCIETY OF LONDON.

March 3rd, 1920.—ELECTION OF FELLOWS.—MESSRS. E. H. Blackmore, President of the British Columbia Entomological Society, P.O. Box 221, Victoria, B.C.; Ernest Hargreaves, Zoological Dept., Imperial College of Science, South Kensington, S.W.7; Arthur Loveridge, Nairobi, British East Africa; and John George Rhynehart, Harriestown, Taghmon, Co. Wexford, were elected Fellows of the Society.

PROPOSED ALTERATION OF THE BYE-LAWS.—It was announced that a Special Meeting would be called to consider alterations in the Bye-laws proposed by the Council, and these were then read for the first time. It was agreed that the Special Meeting should be held immediately before the ordinary meeting on May 5th.

DEATH OF A FELLOW.—The President announced the death of Dr. Gordon Hewitt.

SEASONAL DIMORPHISM IN ANDROCONIA.—Dr. F. A. Dixey exhibited some outline drawings showing variation in form between the scent-scales of the spring and summer form of several butterflies, including *Teracolus evagorè*, *Agriades thersites*, *Pieris (Ganoris) rapae*, etc.

BUTTERFLIES FROM CYPRUS.—Mr. H. J. Turner exhibited many of the Cyprian Butterflies with which his paper (read later in the evening) was concerned, and explained their characteristic features.

ODONATA FROM MACEDONIA.—Capt. J. Waterston exhibited a set of Macedonian Odonata collected by himself in 1917-1918. Annotated lists of them have been published in vols. li. and lii. of *The Entomologist*. He recalled the leading facts in the history of one of the species, *viz.*, *Selysiotthemis nigra*, Lind. (*Libellulidae*).

FORMS OF *HELICONIUS DORIS*.—Mr. W. J. Kaye exhibited *Heliconius doris*, Linn., from Trinidad, of the blue, green and red forms, and from Columbia a specimen of an *amathusia* form uniting the blue and red form in one, to show the disposition of the hindwing streaking of the blue, green or red forms.

LYCAENIDAE FROM CEYLON.—Mr. Riley exhibited some *Lycaenids* from Ceylon on behalf of Mr. W. Ormiston of Kalupahani. The specimens included aberrations of:—1. *Zizera lysimon*, Hb. A female with extra spots added irregularly on underside of forewing. 2. *Zizera gaika*, Trimen. A similar aberration. 3. *Catochrysops pandava*, Horsf. ♀. 4. *Tarucus telicanus* f. *plinius*, Fab. Aberration with coalescent spots. 5. *Nacaduba noreia*, Feld. ♀. This insect described by Felder in 1864 has never since been correctly determined. 6. *Nacaduba dana*, de Nicé. ♂. Aberration with the markings of underside almost entirely absent. 7. *Nacaduba atrata*, Horsf. Aberration with forewings with dissimilar markings. 8. *Nacaduba nora*, Feld. 9. *Chilades lainis*, Cram. 10. *Aphnaeus nubilus*, Moore, and 11. Other species of *Aphnaeus*.

HORNED BEETLES.—Mr. G. J. Arrow showed a series of lantern slides to illustrate different types of armature occurring in Lamellicorn Beetles.

RHOPALOCERA FROM CERAM.—Mr. Talbot, on behalf of Mr. Joicey, exhibited several new and little known *Rhopalocera* from Central Ceram.

EVIDENCE THAT THE *VIOLA*, BUTL., ♀ F. MIM. OF *CHARAXES ETHEOCLES*, CR., FLIES WITH ITS MODEL *C. EPIJASUS*, REICHE.—Prof. Poulton said that at the Meeting of last December he had shown a lantern slide representing these two species captured in the same locality and within a few days of each other. He now communicated a confirmatory letter he had received from Lt.-Col. R. S. Wilson, Governor of the Western Desert Province of Egypt.

THE ATTACKS OF BIRDS ON BUTTERFLIES WITNESSED IN NYASSALAND BY W. A. LAMBORN. THE MARKS OF A BIRD'S BEAK RECOGNISABLE ON REJECTED WINGS.—Prof. Poulton exhibited and illustrated by lantern slide the examples enclosed in a letter from Mr. W. A. Lamborn. The method of transport had not caused any deterioration, and the marks of the bird's beak at the base of the wings were quite clear.

OBSERVATIONS ON THE ENEMIES OF THE LARVÆ OF THE PIERINE BUTTERFLY *CATOPSILIA FLORELLA* IN EAST AFRICA.—Prof. Poulton said that he had also received a series of interesting notes by Mr. Lamborn on the the larvæ of *C. florella* and their enemies.

PAPERS.—"Butterflies of Cyprus," by H. J. Turner, F.E.S. "An undescribed *Lycaenid* from Cyprus, *Glaucopsyche paphos*, n. sp.," by T. A. Chapman, M.D., F.R.S., etc.

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Desiderata.—Cratagata, Sambucaria, condition immaterial. *Duplicates.*—*Dominula mendica*, and numerous common species.—E. A. Cockayne, 65, Westbourne Terrace, W. 2.

Desiderata.—Foreign examples, local races, vars. and abs. from all parts of the world of any butterflies included in the British list. Setting immaterial; exact data indispensable. Liberal return made.—W. G. Pether, "Thelma," 4, Willow Bridge Road, London, N. 1.

Duplicates (all Clydesdale).—*Æthiops*, *Selene*, *Icarus*, *Phloas*, *Hectus*, *Mundana*, *Perla*, *Fulya*, *Nictitans*, *Tritici*, *Chi*, *Boreata*, *Cambrica*, *Belgiaria*, *Immanata*, *Olivata*, *Tristata*, *Boreata*, *Mercuriella*, *Angustea*, *Dubitalis*, *Ambigualis*, *Truncicolella*, *Derepitalis*, *Kuhmella*, *Fusca*, *Margaritellus*, *Hortuellus*, *Hyemana*, *Phryganella*, *Ferrugana*, *Salandrinana*, *Sponsana*, *Conwayana*, *Stramineana*, *Rivulana*, *Urticana*, *Octomaculana*, *Perlepidana*, *Yaccinana*, *Geminana*, *Herbosana*, *Myllerana*. *Desiderata*—Numerous.—A. A. Dalglish, 7, Keir Street, Glasgow.

Duplicates.—*Phigalia pedaria*, melanæ and intermediate forms in great variety.

Desiderata.—Numerous common species.—M. Corbett, 3, Thorne Road, Doncaster.

Mr. Donisthorpe will still be glad to receive ants and Myrmecophiles from all parts of the British Isles, and to name any such for anyone who is kind enough to send them to him. He would however suggest that ants from any other parts of the world be sent to his colleague, Mr. W. C. Crawley, 29, Holland Park Road, W. 14. Mr. Crawley is specialising on the ants of the world, and it is a matter for congratulation that we should possess an Entomologist in this country whose whole attention should be concentrated on this branch of Entomology.

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m. 1920, October 6th and 20th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E. 3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street, E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. (No Meetings in July or August.) Visitors welcomed. Hon. Sec., W. E. GLEGG, 44, Belfast Road, N. 16.

All MS. and editorial matter should be sent and all proofs returned to H. J. TURNER, 98, Drakefoll Road, New Cross, London, S.E. 14.

We must earnestly request our correspondents NOT to send us communications IDENTICAL with those they are sending to other magazines.

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The Swiss species of the Genus *Hesperia*. (Plate iii.)

By B. C. S. WARREN, F.E.S.

(Concluded from p. 121.)

H. onopordi, Rbr.

This interesting species occurs in several localities in the Rhone Valley, but I have only taken it between Branson and Follaterre; where it flies in the meadows by the Rhone canal, at the former place; and over a considerable part of the hillside at the latter.

It is double-brooded and has the distinction of being the first *Hesperia* to appear in the spring and the last to disappear in the autumn; its only rival in this respect being *armoricanus*. In a normal year *onopordi* emerges in the middle of April, most of the other spring species not appearing before the end of the month.

The first brood is a much shorter time on the wing than the second, and is usually over by May 20th; never, to my knowledge, surviving until June: the second, commencing in the middle of July, lasts to the end of September. The emergence of the second brood is more extended, which explains its long duration. I have taken single fresh examples with quite worn ones as late as September 2nd and 16th. Curiously enough, although the ♂s are just as abundant in both broods, the ♀s are extremely rare in the summer and autumn. In fact, I have only taken 2 ♀s of the second brood, in the course of four seasons, though they are plentiful in the first. When I say "plentiful," I do not mean they were in numbers like the ♂s. I have only noted two species in which the number of the two sexes seem to be approximately equal; *cacaliae* and *carthami*; in the latter at Follaterre sometimes the ♀s were more numerous than the ♂s.

The distribution of *onopordi* in the Follaterre district is remarkable. At Branson it is confined to the water-meadows along the edge of the Rhone canal, where it never leaves the long grass. The collector who searches the neighbouring vineyards or road, will not find a single specimen. Yet going towards Follaterre the small patches of uncultivated ground in and round the vineyards produce it, and just before getting to Follaterre it is found abundantly on a patch of bare and precipitous rocks. About a hundred yards beyond these rocks we find it again on the canal banks in company with such species as *M. didyma*, *P. manni*, *A. lineola*, etc., and many "blues." On the sandy hillside at Follaterre it flies over most of the lower parts, but only ascends about 400 ft. In these various habitats, some of which are of very considerable area, and others very restricted, the insect is confined to certain limits; though considering the diverse nature of the country within those limits, it seems remarkable that it does not occur everywhere on the right bank of the Rhone.

I have always regarded *onopordi* as a lowland species, and was therefore much interested and surprised when first I saw Mons. Oberthür's record of the occurrence of var. *conyzae* at Zermatt, the only other suggestion of an Alpine habitat for this species which I had noted being a single specimen in the collection of a friend, which was supposed to have come from Bérisal, many years ago. As it was only a single specimen out of a good number of *Hesperidae* from the same locality, I was inclined to think it might have been taken a little above Brigue, and so got mixed with specimens from a little higher up; but

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in view of the Zermatt record it is quite possible it came from Bérisal. Why, and how, *onopordi* came to ascend to these levels in this one district, it is impossible to say; nowhere that I have collected in the Alps have I ever seen the species, and Prof. Reverdin tells me that his experience has been the same. Dr. Chapman notes the occurrence of *onopordi* at Spondinig on the Stelvio, at 2800 ft. This is about 1000 ft. higher than the summit of its vertical range at Follatterre, but is still much below the Bérisal level. It is to be supposed that when *onopordi* does occur over 5000 ft. it will be single-brooded.

Onopordi is, on the whole, an easily identified species; the characteristic feature of the group, together with the hooked spot of the median band underside hindwing, give it an appearance easily recognised, and distinctive. There is no appreciable difference between the individuals of the two broods of *onopordi* in the Rhone Valley (though, as in the case of *armoricanus*, Dr. Verity finds distinctions which he considers important enough to merit a name, between the broods in Italy), but, curiously enough, some ♂s of the second brood are larger than any ♂s or ♀s of the first.

The ground colour of the hindwing underside shows some variation, not unfrequently being of a fine tone deeper even than *carlinae*; but it is not so constant as in that species. It wears badly, and after the species has been a week or two on the wing, it is difficult to find a specimen not considerably faded. Unfaded examples, in which the colour is much paler and yellowish, are found occasionally; and in this connection mention must be made of var. *conyzae*, Guénée. It is still doubtful whether this form is only an aberration, in which case it was absurd to name it; as no man living could determine what constituted the limits of one shade in this variable colour. In answer to a question of mine, Prof. Reverdin, with much kindness, sent me all the information he had concerning this form, in detail. The type specimens were not taken in Switzerland, but some distance on the French side of the frontier. Whether the form was racial in that locality remains the chief question; but, unfortunately, it has never been re-discovered. The type *conyzae* only differed from *onopordi* in the grey tone of the ground colour underside hindwing; so it is to be presumed, by M. Oberthür giving the name to the Zermatt specimens, that a pale coloration is racial and constant there. Judging by the unstable nature of this colour in *onopordi*, I find this difficult to credit; also the specimen from Bérisal was of as fine and deep a colour as any I have seen. That is how the matter stands. There always remains, of course, the possibility that in the future, a race of *onopordi* with a distinctive coloration underside, will be found in some distant locality.

The var. *reducta* occurs in various degrees in *onopordi*. The extreme form, in which the "anvil-shaped" spot has its inner edge level with the band, is not at all so rare as in *andromedae*, and occurs in both broods; it does not seriously affect the identification of the specimen, as the other characters (black outlining of spots, hooked spot, etc.) remain unchanged. This form too, never looks so like *carlinae* or *armoricanus*, as the converse aberrations of these species look like *onopordi*.

H. malvae, L.

In this species and the next (*malvoides*) we find a greater tendency

to transitional variation than in any other species of the group. They are also remarkable in that they are the only species of the B. group in which the *reducta* aberrations occur really commonly. The most usual form of the median band is one with only a slight projection towards the base of the wing from the central spot, while the formation of the other spots comprising the band, varies in an almost endless manner. Consequently aberrational forms occur which are slightly like *onopordi*, *fritillum*, *carlinae*, and *armoricanus*. Such forms might occasionally be difficult to identify, were it not for the basal spots. By these one can, almost always, distinguish *malvae* and *malvoides* from any other European species at a glance. In *malvae* and *malvoides* the basal spots (hindwing underside) are very small, and approximate in size and character the spots located near the hind margin of their wing; while, in the other species of both groups, the basal spots are large, and approximate in size and character to the spots of the median band.

When Dr. Reverdin published his account of *malvae* and *malvoides*, he noted that at that time no specimen of *malvae* had been found among those he examined from the Canton Valais. Now I cannot say that I have taken *malvae* in the Valais, but I have no doubt it can be taken there. It is common round Bex, and in many places between that place and Villeneuve, and in this stretch of country there can be little doubt that it occurs on both sides of the Rhone. It flies in places actually on the right bank, and as conditions on both sides are the same, there is but little cause to suppose *malvae* to be restricted to the side of the Canton Vaud. But even if *malvae* is, in the future, found in this part of the Canton Valais, there is no doubt it is absent from the rest of it. The chain of mountains, which as it were crosses the Rhone Valley at St. Maurice, appears to have barred *malvae* from the plain of the valley above that place. It occurs along the hillside on the north side of the valley, almost as far as Lavey les Bains; being quite abundant in spots through the wood, but never descending to the flat of the valley.

Malvae is on the wing in late April or early May, according to the altitude; but it is not by any means over before *malvoides* emerges, as one often hears it said to be. Any day during the first fortnight of May the collector could take both species on the same day, in the Rhone Valley, if he wished to do so.

Malvae varies considerably. The ab. *taras* is well known and widely distributed, it needs no further comment. Another marked aberration of *malvae* is the ab. *bilineata*, Rev. In this form, described by Prof. Reverdin, from two ♂s from Asia Minor, the two last spots of the discoidal series, next the inner margin, forewing upperside, are united to the two basal spots; forming two parallel white lines along the inner margin of the wing. These spots, in forms transitional to ab. *taras*, are often found united into a single blotch of white; usually, however, taking in one or more of the upper white spots of the discoidal series as well. Such aberrations are common; but the ab. *bilineata*, in which the confluent spots form two separate white lines, is somewhat rare. Only one European specimen was known to Prof. Reverdin at the time he named it. I have a fine example, which I took in the neighbourhood of Caux. It is the only Swiss specimen I have seen or heard of.

The underside varies greatly. As already noted, forms of *ab. reducta* are of common occurrence. In these aberrations, however, there is nearly always a general reduction of the white markings. Occasionally this reduction is so extreme that the band is reduced to a single spot at the outer margin of the wing. The costal basal spot, too, is occasionally wanting. Both these forms are rare.

H. malvoides, Elw. and Edw.

Speaking roughly, *malvoides* may be said to be confined to Europe, west of the Adriatic, and south of about 45° N. lat.: occurring in Spain and Portugal, Italy and Sicily, Southern France, and a very limited part of southern and eastern Switzerland, where it attains its most northerly habitat. *Malvae* only enters this area in one or two places in south-eastern Switzerland and north Italy. Perhaps I ought to apologise for repeating these facts, which are, of course, well known to the few that study the Hesperiidæ; but I have seen notes announcing the capture of *malvae* at Vernet-les-Bains in 1913, and of another alleged *malvae* at Aix in Provence, in 1914, which seems to suggest that a little repetition may still be of some use.

Knowing that *malvoides* was recorded from Martigny and *malvae* from Gryon, I spent a good deal of time looking for these species, in order to find out how closely they approached one another in this district, and whether they overlapped at any point. I may at once say that so far as the Rhone Valley is concerned, I am quite sure that they do not overlap; but they are found in closer proximity there than anywhere else that has at present been recorded. I found *malvoides* at Branson, Follatterre, Vernayaz, and Salvan; higher up the valley it is found in many places, but Vernayaz is the nearest point to St. Maurice reached by the species. As previously noted, *malvae* occurs on the hillside at Lavey-les-Bains; so that in actual distance there is only some nine kilometres between the two species at this point.

With regard to the general distribution of these species in Switzerland, it is interesting to note the following. The areas inhabited by both are sharply divided by a natural barrier. The great chain of the Alps, of the Bernese Oberland, Uri, and Glarus, which run across the country in a more or less straight line, from the N.E. to the S.W., divide the two species. Although both occur in the mountains they do not seem able to rise to a greater elevation than 6,000 ft. I have seen instances of this with both species. In the Grisons, at Lenzerheide, *malvoides* occurred all through the neighbourhood, between 4,800 ft. and 5,600 ft., in great numbers, and more rarely up to about 6,000 ft., but above this it failed to appear. Similarly, in the Bernese Oberland, at Kandersteg, *malvae*, though very common, never occurred much, if at all, over 5,300 ft. In the Vaud I have taken it at a slightly higher level, but never quite up to 6,000 ft. Consequently along this range of mountains, bordering the valleys of the Rhone and upper Rhine, we find *malvae* on the northern slopes, and *malvoides* on the southern. How *malvae* surmounted this barrier and got down to the southern Grisons, where a single specimen was taken, it would be hard to say; for although it has turned the north-western corner at St. Maurice, it apparently is not inclined to extend along the flat of the valley.

Malvoides appears early in May in the Rhone Valley, but seldom lasts more than three or four weeks. It is double-brooded in most

localities, and I fancy in some southern ones it is triple-brooded. In Switzerland the second brood is very partial, and possibly in many seasons non-existent. The only second brood example I have taken was a ♀, at Follatterre, on July 18th. I have collected in the various localities where the first brood flies, through several consecutive seasons late into September, without ever finding another specimen that could have been a second brood one. In the mountains there is, of course, only one brood; but this, in my experience, is of much longer duration than any brood in the plains. The emergence, however, does not take place much later than the first emergence in the plains, even at the highest altitudes. It has been often recorded as not appearing until July in the Alps, but this is quite a mistake. At Lenzerheide (Grisons), at a little over 5,000 ft., I found it on the wing by May 20th, and it was still to be seen on the wing until mid July. Some seasons it should be found even earlier, for it was a late spring the season I was there; but collectors do not often visit such altitudes in the middle or beginning of May, which is doubtless the origin of the July supposition. The same applies to *malvae*, which I have taken at just over 4,000 ft. on May 10th, indeed the same can be said of any species of *Hesperia* which occurs both in the lowland and alpine regions. The date of emergence is never changed by a rise of 2,000 ft. more than eight or ten days; and a rise of from 4,000-5,000 ft. rarely retards emergence more than a fortnight.

On the habits of *malvoides*, Prof. Reverdin gave some interesting notes, from several well known entomologists. It was suggested that *malvoides* inhabits moist, or even swampy, localities, while *malvae* shows a preference for dry ones. My own experience has given me similar results, as far as *malvoides* is concerned; I have never found it except in damp and swampy places, often in marshes, on the banks of streams, etc.; but with *malvae* it has been different. I have taken it usually in dry localities; but on three occasions I found it in absolute swamps. The first, a single specimen in the St. Triphon marshes; the second, in the swampy locality on the bank of the Veraye Torrent at the foot of the Rochers de Naye, famous for *L. amphidamas*, where *malvae* is abundant every year; the third, in the Wageti marshes at Kandersteg, where *malvae* is common, flying with such water-loving species as *P. delius*, *B. ino*, and *andromedae*. I am afraid then, the nature of its habitat will never be evidence enough to determine the identity of the species by; but all the same, *malvoides* seems to be only located by or near water.

The transitional variation of *malvoides* is of some interest, and particularly so when it affects the basal spots. The value of these as a distinguishing characteristic has already been mentioned, and though they are just as subject to minor variation as any other marking of the hindwing, there is only one development which robs them of their value. When the basal spots are considerably enlarged the species assumes some likeness to an aberrant specimen of *fritillum*, in which these spots are somewhat smaller than in the type. Now, this aberration affects *malvoides* only, for although it occurs in *malvae* also, as that species is single-brooded and over at least two months before *fritillum* emerges, there can never be any question as to its identity. In the southern area, however, where *fritillum* and *malvoides* both occur, the second (? third) brood of the latter would coincide with the

one brood of the former. Even so if any number were taken it would be easy enough to separate them; but if a single aberrant *malvoides* with abnormal development of the basal spots, was taken with some number of *fritillum*, it might be difficult to identify superficially. In such a case one would have to depend on one or more of the following characters of *malvoides*, none of which are really constant, but one or two are always present, so far as my experience goes. (1) Small size and less prominent development of white upperside; (2) the nervures and ground colour of hindwing underside of different shades; (3) general irregularity of all white markings of hindwing; and (4) browner ground colour. In Switzerland, however, *fritillum* does not occur in the area inhabited by *malvoides*.

As in *malvae*, the var. *reducta* is frequently found, but an increase in size of the basal spots never coincides with a reduction of the spots of the median band, and therefore the various aberrations of the *reducta* form never confuse the identity of the species.

This completes the list of the Swiss species, but some mention must be made of *H. centaureae*, for Mr. Wheeler included it in his Butts. of Switzerland on the strength of a record of Rätzer's, recording the capture of it in the Steinen Tal (Simplon Pass) in June and July. That this record was the result of an error in identification there can be no doubt. Prof. Reverdin tells me he believes it to be so, and that he has never seen a Swiss specimen of *centaureae*. I may also add, that I have never met anyone who has, or heard of, any capture. What species Rätzer took in the Steinen Tal, one cannot say, but I strongly suspect it must have been the ubiquitous *andromedae*; the only alternative being *cacaliae*; for the date, June, at that height excludes the possibility of *alveus*, and it seems impossible that he could have mistaken *serratulae* for *centaureae*.

I cannot end these notes without acknowledging the kindness and promptitude with which Professor Reverdin has always been ready to give me the benefit of his great experience in detail, whenever during the past few years I have asked for his opinion on any obscure point.

The accompanying plate illustrates some of the very variable *extensa* and *reducta* formations, of a few species of each group, with one or two typical specimens for comparison. The figures are exactly natural size, so may be useful as an indication of the features which may be developed in species of either group by this convergent line of variation.

EXPLANATION OF PLATE III.

A.

1. *H. alveus*, type. 2-6. *H. alveus*, *extensa* formations. 7. *H. serratulae*, type. 8-9. *H. serratulae*, *extensa* formations. 10. *H. carlinae*, type (larger than normal). 11-12. *H. carlinae*, *extensa* formations.

B.

1. *H. andromedae*, type. 2-4. *H. andromedae*, *reducta* formations. 5. *H. cacaliae*, type. 6-8. *H. cacaliae*, *reducta* formations. 9. *H. onopordi*, *reducta* form.

Further Notes from Palestine.

By H. W. ANDREWS, F.E.S.

The following notes are in continuation of those that appeared in a former number of this magazine and deal with further entomological

observations up to the close of the campaign in Palestine and Syria. In addition, I have incorporated a good many general remarks which I trust will prove of sufficient interest to warrant their intrusion in a scientific periodical. The opening paragraph of the former notes pointing out their necessarily indeterminate character may be taken to apply equally to these, as although I had some apparatus sent out from England it arrived too late in the season of 1918 to be of much use and during the active military operations in the latter part of the year had to be "dumped" with all other baggage. I have had the advantage, however, of access to the collections in the Entomological Section of the Ministry of Agriculture in Cairo, and have to thank Mr. G. Storey and Mr. E. W. Adair of that Department for their kindness and courtesy to a mere "other rank" in helping him to identify several of the more common insects referred to in the course of this article.

During the summer of 1917 my unit remained in Lower Palestine facing the Turkish lines below Gaza with but little doing beyond the daily shelling and occasional raids on our part. Everything was very dried up, and except for grass-hoppers, ants and house-flies, insect life was scarce. In August the camp was moved down to some fig-groves on the coast, the fig-trees growing out of the bare sand. Here I noticed a few Pierids and a fair-sized sand-wasp with a grey black-marked abdomen and lemon-coloured legs and mandibles, a silvery sand-frequenting species of ant, and among the Diptera a small Trypetid (? a *Carphotricha*) which was abundant, a *Chrysophilus* (?) and an Asilid (*Philonicus*?). On our return to the downs inland I was laid up with a bout of fever and sent down the line to Cairo. Here in a small garden attached to the barracks at Abbassia I noted in Diptera a species of *Siccus*, *Catacomba pyrastris*, a *Syrphus* and an *Eristalis*; a small skipper butterfly was not uncommon, and the common Eastern hornet (*Vespa orientalis*) was abundant round about the refuse tubs. I rejoined my battery in October and remained until the end of the month when I had ten days leave which I spent in a hasty visit to Luxor. I spent all my available time visiting the marvellous ruins, but noticed one or two specimens of *Danaida chrysippus*, a very handsome dragon-fly with a deep red body and wings, a number of webs of some gregarious caterpillar on the mimosa trees, and also a large number of spiders' webs on some telegraph wires! On my return from leave I was detailed to take over the charge of a baggage dump at Belah, some eight miles south of Gaza, where I spent a somewhat monotonous time until the beginning of February. There was not much vegetation and insects were scarce. At times it was even difficult to find house-flies in sufficient numbers to feed the chameleons which were kept as pets in many of the tents. Towards the end of January scarlet anemones and a pretty little iris appeared in flower, and I noticed some humble-bees, a small Syrphid fly and odd specimens of *Pyrameis cardui*.

At the beginning of February I left Beleh and rejoined my battery at Mulebbis, a good-sized village situated some six miles inland and the same distance north-east of Jaffa, and I remained there until mid-July. Mulebbis is one of the oldest Jewish colonies in Palestine, having been founded in 1878, and is surrounded with extensive orange groves and orchards, interspaced with well grown belts of eucalyptus planted for

drainage and (?) febrifugal purposes. Between Mulebbis and Jaffa lies the coastal plain of Sharon watered by the River Auja, and a few miles to the east is the commencement of the range of limestone hills that form the backbone of Palestine. The soil was dry and sandy but appeared to be very fruitful where cultivated. The numerous orange and lemon groves were separated by lanes over-shadowed by tall hedges of mimosa on either side, with an occasional stretch of cactus; and these lanes, with the red-tiled roofs of the majority of the houses as well as the European dress of the colonists, formed a great contrast to the flat-roofed, mud-built villages and the universal eastern costume met with in the districts below Gaza, and gave quite an English aspect to the landscape, reminding me more especially of some of the fruit-growing districts of Kent. Oranges and lemons were very plentiful as might be expected, and although sundry regulations were issued prohibiting the troops from picking them, these were more honoured in the breach than the observance, at any rate by troops quartered in the groves. Units less happily situated had as a rule an orange ration issued to them, but our own men had as many as they liked to eat for the picking—with the full acquiescence of the owners be it said.

Each grove had its own well for irrigation purposes; not such wells as we have in England, but consisting of a masonry shaft some 50 feet deep and 18 feet or so in diameter, the piping for the water being carried down the centre into the ground and braced by iron girders at intervals. When in use the water was pumped up by stationary steam or gazogene engines into fair-sized reservoirs of stone or cement (which formed admirable open-air swimming baths), and let out thence into the stone or gutter-piping drains which intersected the groves in all directions. There was almost always a shallow pool of water at the bottom of the well-shafts varying in depth from a few inches to a couple of feet, and these pools, the reservoirs, and the numerous little subsidiary basins in the gutters, formed favourable breeding grounds for mosquitoes; moreover the locality was known to be malarious. The R.A.M.C., however, proved equal to the task of tackling this danger. The whole area was marked out into districts; all wells, pools, etc., marked; samples of the water taken and inspected for the purpose of detecting the presence of mosquito eggs or larvæ; and in every case where the presence of mosquitoes was proved, the water was treated to a mixture of crude oil and paraffin well stirred in, and this treatment was renewed where necessary at periodical intervals. In Mulebbis *Culex* larvæ were found more commonly than those of *Anopheles*; but at Medjal-Yaba, in the foothills some miles further inland, where the water-supply was derived from cave wells, *Anopheles* was the prevalent genus. Another anti-malarial measure was taken by cutting down the vegetation near the bridges and bathing places on the River Auja and the ways leading down to it. This necessarily entailed a good deal of labour, but when there is an Army available such work can be carried out to an extent impracticable to local effort and hired labour. Mosquito nets were issued to the troops, and carefully drawn up instructions sent to all units. One unavoidable evil lay in the fact that practically the whole resident population was infected with malaria, but as a result of the above mentioned precautions there was nothing like an epidemic among the troops quartered in the

district, although a certain number of cases occurred. Incidentally it may be remarked that the Turkish armies were reported to have suffered far more severely from this insect-borne disease than the British and Indian forces opposed to them. I did not myself see an *Anopheles* mosquito during my stay at Mulebbis, although *Culex* was not uncommon.

From March to the end of May there was a great wealth of wild flowers in the groves. These gradually withered away in June and July until in the latter month the plains became a waste of dried up thistles and *Umbelliferae*. I noticed that these latter flowers when fresh did not attract insects to anything like the extent they do in England, and another feature that struck me as curious was the fact that the wild flowers around and under the trees might be alive with beetles, flies, and occasional butterflies, but they one and all neglected the orange blossom, and I did not understand how fertilisation was carried out. I asked one of the proprietors and he told me that bees were the agents, but they were very seldom seen at the blossoms, and I only remember noticing one row of hives. It may be that nocturnal Lepidoptera have something to do with the fertilization, but I have no notes of seeing any moths at the flowers and any systematic night work was out of the question.

All the undergrowth of flowers and weeds in the groves was cut down and the ground dug over during the month of April prior to irrigation. While they lasted these flowers attracted many insects but not a very large number of species. My observations were confined to the orange groves and lanes near by, and I had no opportunity except on one occasion of going out on the plains or to the hills. In this cultivated area butterflies were but poorly represented and I saw nothing in the nature of the large flights referred to in my previous article as occurring in the spring of 1917 near Belah. It is possible that the latter district lies in a migration track or there may have been some exceptional weather conditions. *Colias edusa* and one or two species of Pierids (*Euchloë belemia* and *Pieris brassicae*) were generally common. A small blue (*Zizeeria karsandra*) was also very common; a larger blue was once or twice seen, but not closely enough to identify it with any certainty. *Rumicia phlaeas* was not at all uncommon and a small skipper (*Carcharodus althaeae*) fairly frequent. I saw one brimstone and every now and again caught a glimpse of a swallow-tail. The only occasion on which I saw a variety of butterflies on one day was on May 16th, when I had a holiday and followed the course of a wady, down to the River Auja. Here, especially towards the river end where the vegetation was almost tropical in its density, I saw more insects at once than at any other time during my stay in Palestine including most of the butterflies mentioned above and in addition several Satyrids closely resembling Meadow-browns, and two or three *Danaida chrysippus*.

With regard to moths, *Macroglossa stellatarum* was common at Mulebbis, and three or four specimens of the fine Atlas moth *Saturnia pyri* were brought to me for identification. Geometers of several species came to light or were disturbed from the undergrowth during the daytime; amongst others a small emerald (*Nemoria faustinata*) on the 16th April and on several subsequent occasions, also a *Eubolia* (?) resembling *E. plumbaria* and two or three species of *Eupithecia*. The

only Noctuid that I recognised was the well known *Plusia gamma*. During May a handsome Burnet moth (*Syntomis mestratii*) was often seen. My observations of moths were very scanty as it was distinctly unadvisable to go about with lights at night and anything like sugaring was out of the question. On the whole lepidopterous life was disappointing.

Dragonflies were not common at Mulebbis, but by the River Auja on the 16th May they were present in considerable numbers and variety, one species with mauve wings and body being specially noticeable for its translucent beauty in the sunshine. Several species of small ant-lions occurred, first noticed on the 8th May and subsequently quite common, and a much larger species with variegated wings was not uncommon later in the season. In April I noticed a small Trichopteron in some numbers round one of the basins in the irrigation channel of an orange grove. A lacewing fly (*Chrysopa vulgaris*) (?) was brought to me for identification once or twice.

I did not observe many Coleoptera, but I know nothing of this order and probably passed over many species. Those noted are as follows: a densely pubescent species (? *Tropinota squalida*), probably identical with that noted in my previous article as occurring at Kantara in March, 1917, was extremely common on flower heads in the latter half of February and during March. Its place was taken later by another day-flying species, bright red in colour and about the size of a honey bee which was as common on the flowers as the familiar soldier beetles *Telephoridae* are on *Umbelliferae* at home. A *Scarabeus* with a rhinoceros-like horn, *Phyllognathus silenus*, was brought to me on the 15th March, attracted by light, and from time to time other species of this genus turned up. Large dung-rolling beetles (*Pimelia*) were also seen. On the 16th May I noticed tiger beetles at the River Auja. Fireflies were not at all uncommon and first noted at the end of April, and water beetles occurred in some of the tanks in the groves.

Crickets (*Liogryllus bimaculatus*) were almost as common as in Egypt; mole-crickets were not uncommonly found in the irrigation tanks, which seemed to have a fatal fascination for them; a large variety of grasshoppers and some locusts seen, but no swarms of the latter occurred. The large size and clumsy flight, of a large species of locust (*Pachytylus danicus*) when disturbed caused me more than once to mistake it for a startled bird. Two or three kinds of *Mantidae* occurred.

Hymenoptera were abundant both in numbers and species. Ants of three or four species were very common and some of their "runs" plainly visible in the short grass and extended some twenty yards or more. A shining black species (? *Pheidole megacephala*) about half as large again as our common garden ant in England, was noticed swarming in small columns about four feet high just over its nests. These swarms were first noticed on the 21st May and at a little distance looked like so many columns of smoke from small fires. They were only in flight from about 7 to 10 in the mornings, and continued for a fortnight or three weeks. Among other Aculeates, solitary bees of numerous species were abundant; the dry sandy soil seemed well suited for them and they flourished accordingly. On the 18th February a species of mason-bee was very busy exploring the walls of the shed in

which we were quartered and the large clumsily built ant *Doryllus juvencus* ♀ came to light every now and again.

Respecting the social Hymenoptera several large bumble-bees were seen at the River Auja on the 16th May. I have remarked above on Honey bees; their place and that of wasps was taken by the common hornet of Egypt and Palestine (*Vespa orientalis*). A large kind, possibly queens, were quite common from the middle of March to mid June, when they gave place to smaller ones (? workers). I once came across a ground-nest in the open plain (as a rule they do not nest in the open ground but on roofs of sheds, etc.) it had rather a wide exit of some two inches in diameter. The hornets did not seem at all vicious and only two cases of stinging came under my notice; one of a man who unfortunately for himself disturbed a nest while bathing and got badly stung; the other occurring on the trek up from Haifa to Beirut when one of the horses of the Battery Staff must have trodden on a nest. There was a considerable disturbance and a relaxation of march discipline for the time being on the part of the staff, and the guns and wagons following made a discreet detour, but the only sufferers were one or two of the staff horses. I did not see the common wasp (*Vespa vulgaris*) until we were at Beirut in November, 1918, when it took the place of the hornet, but probably owing to the lateness of the season was not common. A handsome thin-waisted wasp (*Sceliphron spinifex*) first noticed on the 16th April, was subsequently very common in the dug-out telephone pit in the gun line at Mulebbis taking little or no notice of the operators and indefatigable in building its little clusters of mud cells and storing them with small spiders. Sundry sawflies were noticed.

Diptera were numerous but unevenly distributed as regards families. This order being my speciality I naturally devoted extra attention to it. I have already mentioned the anti-mosquito campaign in the earlier portion of the article; *Culex* was quite common and *Anopheles* also occurred, although I did not myself come across any whilst in Palestine. A smallish *Nemocera* (a Chironomid?) was also very common coming to light at dusk. I frequently had specimens brought to me as possible malarial mosquitoes. I have no notes of any *Tipulidae*, but a minute midge, I do not know of what genus, was a great torment. These midges first appeared about the middle of June and lasted for a fortnight or more, they had an irritating bite but contrary to our English midges they were most troublesome in the daytime and in sunshine and disappeared at dusk. A species of *Bibio* (? *marci*) was common for a few weeks from February 12th onwards.

Dolichopodidae were not at all common, a species of *Psilopus* was seen on the eucalyptus leaves at Mulebbis, and another species (genus uncertain) in some numbers on the 14th May at the muddy margin of some small pools in the vicinity. These were all I noted.

Empis tessellata first occurred on the 16th March and was very common whilst it lasted, a Tachydromid was common in the orange groves towards the end of March and a few small Empids occurred in April, but this family as well as the *Dolichopodidae* seem to be poorly represented.

The families mentioned in vol. v. of Verrall's work on flies (*Stratiomyidae*, etc.) were the best represented of any. A small *Bombylius*, first noted on 27th March (*B. flavipes*, Wied.), was very

common on flowers and the dry sandy borders of paths in the orange groves; and much less commonly a larger species of *Bombylius* (? *exoprosopa*) with darkened wings and black tipped copper coloured abdomen. A small Stratiomyiid was to be found on the banks of the lanes from April 3rd. I noticed the first Tabanid on the 15th April and from thence onward they were common and a source of annoyance to the horses: a black-winged, black-bodied species; a small species resembling our *Tabanus bromius*; and an *Atylotus* (non-British) were the most common. I did not see any *T. bovinus* or *T. autumnalis*. A species of *Haematobia* also occurred. The first Asilid (? *Dysimachus*) was noted on the 27th of March and another large reddish species resembling *Eutolmus rufibarbis* was extremely common in the fields and on the undergrowth of the orange groves for about three weeks from the 21st April. A species of *Thereva* was seen on the 16th of April and again on the 22nd May on the eucalyptus leaves. The genus *Anthrax* was well represented as might be expected from the numbers of their larval hosts the burrowing bees. I have a note on 24th April of the occurrence of six different species, none of which I had noticed previously; at least two of these were more or less common for some weeks.

In the *Syrphidae*, *Eristalidae* were common, and I more than once noticed their "rat-tailed maggots" in dirty tanks near the wells. *Eristalis tenax*, *E. pertinax* and *E. aeneus* were noted on 16th-20th February. A *Chrysogaster* occurred on 16th March as well as one or two species of *Syrphidae* proper. A *Sphaerophoria* and *Syrphus balteatus* were abundant on flowers in the undergrowth of the orange groves from 27th March onwards. A single specimen of a very handsome black and white marked *Volucella* was seen on 26th May. On the whole this large family was not well represented.

Apart from *Musca domestica*, *Stomoxys calcitrans* and one or two species of bluebottle, *Muscidae* were absent, but the first named species easily predominated over all other kinds of insects in numbers and persistence as it occurred all the year round. *Tachinidae* did not seem common except for *Sarcophagi*, some species of that genus being very frequent round about the kitchens and latrines. A few flower frequenting Tachinids were seen. *Anthomyiidae* were also very scarce in species and individuals compared to an English standard. *Anthomyia pluvialis* occurred and was first noticed on 18th February; a species of *Hylemia*? on 20th March; *Melanochiria riparia* was not uncommon round some of the irrigation tanks, it was noted first on 29th March. A species of *Hyetodesia* was abundant near the latrines from 12th April onwards; on the 29th of that month I noticed a small Anthomyiid fly in some numbers on the trunks of eucalyptus trees and a deep blue species (*Ophyra*?) was in great abundance on the leaves of a mulberry tree on 15th June. The above mentioned species were the only Anthomyiids noticed. In the Acalypterate group of Diptera I have only records of a *Sepsis*, very common around the latrines in the orange groves from February onwards, and two species of *Tetanocera* which used to occur on eucalyptus leaves. I do not recollect ever noticing a *Scatophaga*. A species of *Hippobosca* was common among the horses and first observed on the 15th April.

I noticed that tree trunks which in England afford favourite resting places for many species of Diptera did not seem in the least

attractive in Palestine. The only case that came under my notice was that of the small Anthomyiid mentioned above; it must be borne in mind, however, that trees of any kind except eucalyptus, a recent importation, were very scarce, and another factor of some importance was the presence of numerous lizards. The eucalyptus is generally supposed to act as a deterrent to mosquitoes, but this was not the case with *Culex* at any rate, nor did it affect the biting midges I have mentioned. I had good opportunities to test this theory, as from the middle of May to the end of June my quarters by day and night were situated in a belt of eucalyptus between the orange groves and the open plain. As the road on the belt towards the plain was in view as well within gun range of the Turks, it was desirable to keep well inside the eucalyptus belt, and a considerable number of the Diptera recorded above occurred on the leaves of these trees. On the 15th June I noticed what I took to be a case of honeydew attraction. There was a large mulberry-tree in one of the groves adjacent to an irrigation tank, and on that date the leaves—the fruit was barely ripe—were crowded with Diptera, mainly *Musca domestica* and a deep blue Anthomyiid fly, and hornets. I only noticed this once. The irrigation tank just mentioned seemed to have a great attraction for mole-crickets (*Gryllotalpa vulgaris*). We used to go to it between 5 and 6 a.m. for a bathe, and there were usually half a dozen or so swimming round and round the smooth concrete margins which gave them no foothold to get out. I do not know whether they were attracted by the moisture or if they were allured by the moonlight shining on the water. I was carrying one in a handkerchief one morning and was surprised at the strength it exerted in trying to get out. I had to keep my fingers tightly closed over the handkerchief to prevent it forcing its way between them.

On the 1st July the Battery left the Mulebbis gun lines and moved to a training centre on the plain. The ground was parched and few insects except grasshoppers were to be seen. In one spot I observed some rather large sandwasps (*Ammophila*). We stayed here for three weeks and then were ordered to proceed to the Jordan Valley to relieve some R.H.A. units. After two days' trek we got to the hills and began the ascent to Jerusalem. On the western side these hills have a fair amount of vegetation and olive trees are numerous. As soon as we got into the hills butterflies appeared with more frequency and I saw *Teracolus* for the first time. Whites also were fairly common. Four days after leaving the plains we reached the top of the crest and passed through the suburbs of Jerusalem, catching tantalising glimpses of the Holy City en route. The next two nights—as day travelling was now inadvisable owing to enemy aeroplanes—we spent going down to Jericho. The eastern slope of the hills was a great contrast to the ascent from the west. The gradient was extremely steep (within 20 miles the ground falls from 3000 feet above to 1300 feet below sea level) and although we went by the newly made motor road, hairpin curves were frequent and there was only a fragile stone parapet of about 3 feet in height between the roadside and the deep rock-stewn ravines. Instead of the semi-cultivated ground with occasional hamlets there was nothing but arid sun-scorched rocks with one or two ruined buildings at long intervals, and the chalky dust that we stirred up in our passage reminded me of the windward side of a cement factory on the lower Thames. We got to Jericho on the 26th-27th July. The

plain of Jericho and the Jordan valley generally in the summer months takes a good deal of beating for unpleasantness, and anyone who has experienced its oppressive, dust-laden atmosphere will not be inclined to condemn anyone to "go to Jericho" without grave provocation. As stated it lies some 1000 feet below sea level, sinking to 1300 feet below at the Dead Sea, and is inches deep in loose dust which rises in clouds at the passage of animals or motor lorries. The heat was most oppressive both by day and night. A fringe of dust-covered bushes that bordered a little perennial stream running down from the Judæan Hills and a number of dead-looking thorn bushes were the sole specimens of vegetation, except in the gardens of Jericho itself, which consisted for the most part of squalid mud-built houses with a few modern stone edifices and a solitary mosque with a tall minaret. The district has a bad name for malaria and house-flies abounded. There was a story current that the Turks had sent a message in June to the effect "this month flies die, next month men die, we will come and bury you in the autumn." Like other Turkish prophecies it proved false in all particulars.

We lay one night at Jericho and the next night started on the final stage of our destination. As seen from Jericho the plain appears to be practically level to the opposing wall of the hills of Moab, but after proceeding for a couple of miles or so along a gentle decline the road suddenly dips without any preliminary warning into a chaotic series of gullies and valleys carved out of the white crumbling limestone below the general level of the plain. We wound our way through these for another mile and finally reached the narrow belt of vegetation that borders the river Jordan on both sides. There were numerous trees on the river banks (willows, acacias, tamarisks, oleander and poplars are mentioned in a Guide book) and plants that on the plains only grow to a couple of feet or so were present here as quite large shrubs. There was an undergrowth of coarse grass and reeds and we lived in reed-wattled shelters. It was very hot and dusty despite the vegetation and we all suffered more or less from prickly heat at night. The Jordan here was a mud-coloured turgid stream some 50 or 60 yards in breadth flowing with a very strong current between high banks. When bathing, even at daybreak, its temperature was tepid and not at all refreshing. As to insect life, butterflies represented by *Teracolus fausta*, whites, a small blue, and the small copper were very common and there were usually one or two *D. chrysippus* sailing leisurely about on the river banks at the bathing place. Dragon-flies were also a good deal in evidence. I did not notice many flies or mosquitoes but a small midge, nocturnal this time, added to the worries of the hot nights. I several times saw a very large *Anthrax* almost the size of a humble-bee. After a few days stay in this jungle the guns were moved out, to our great relief, and sent back into one of the valleys of the maze of broken hills, through which we passed on our way. Life was more endurable here though the heat was still great. Where the gullies opened out there was usually a scanty undergrowth of stunted brushwood, and the floors of these valleys in the early morning would be damp and sticky with the moisture that oozed out of the surrounding hills. The damp line could be traced on the chalky slopes as plainly as on the walls of a newly built house. As soon as the sun gained strength all was dried up into crumbling dust. A little stream ran

through our particular gulley with a fringe of bushes, and the trough of the valley acted as a sort of funnel for the wind which used to spring up every afternoon usually bringing a dust storm with it. The summits of these hills were weather-worn into all sorts of fantastic shapes and I longed for an artist's gifts to sketch some of the curious outlines. The ground was pitted with the little burrows of ant lion larvæ but there were not many insects. Some of the bushes by the stream were in flower, a lavender coloured blossom of a *Spiræa* type, and what insects there were came to these. A skipper butterfly used to frequent them and an occasional *P. cardui* would put in an appearance but the most constant visitors were large humble-bees with black wings and bodies and a conspicuous yellow thorax; *Xylocopa aestrans* and one or two solitary bees and wasps also occurred. Mosquito nets were "de rigueur," but I did not see any mosquitoes, though we had several cases of malaria or what was diagnosed as such by the M.O. during our stay.

The Battery remained in the Jordan Valley for some six weeks and then we were relieved in our turn and went back to the coastal sector in time to take part in General Allenby's great advance in September. We subsequently followed up the victorious cavalry, trekking across the plain of Esdraelon, which consisted mainly of a sea of very prickly thistles, distinctly unpleasant as bivouac sites, and reached Haifa on the 1st October. Here we made another three weeks stay and a few Lepidoptera were observed, *Macroglossa stellatarum*, an "oak eggar" moth, and "vapourer" moths both in the larval and imaginal states. Silver-fish insects were noted in the building in which the Battery office was situated. The swampy nature of the hinterland of Haifa was probably responsible for a good many cases of malaria that occurred during our stay.

On the 22nd October we received orders to move up to Beirut, and a nine days march along the coast passing Acre of crusading and Napoleonic fame, and Tyre and Saida (Sidon) taking the memory back to the earlier days of the Phœnicians and Biblical history. The gradual change in the character of the vegetation, the buildings and the dress of the inhabitants as we proceeded on our route was very interesting. Between Tyre and Sidon we passed by a deserted cliff-village with a number of caves and rock dwellings, reached by roughly hewn flights of steps cut out of the rock. A fact that specially struck me was the startling contrast between the barren, rocky slopes of the hills on one side of the road and the luxuriant growth of vegetation and fruit trees in the cultivated areas on the seaward side; these areas only occurred in the vicinity of the towns and I suppose were the result of generations of culture, as nothing looked more unpromising than the slopes of these hills. The only insects noted were *Colias edusa* and *Pyrameis cardui*. These two species seem to be the commonest kinds occurring in Palestine, they were noticed everywhere and seen more or less all the year round. We arrived at Beirut on the 31st October and took part in the formal march of the 54th Division through that town at the hour at which the Armistice with Turkey was signed.

Almost as soon as we had reached Beirut the rainy season set in, and this coinciding with an outburst of "Spanish flu" had disastrous consequences on the health of the troops, who were tired out with the strenuous work of the pursuit of the remnants of the Turkish Armies.

I saw only a few insects. A fine specimen of a *Doritis apollinus* was brought to me on the 9th December,* and the usual *edusa* and *cardui* occurred. I noticed some common wasps (*V. vulgaris*?). In the Diptera a Stegomyiid mosquito and a red-bodied Tachinid were both common, the latter to be found running about on the stone walls of the houses. The Battery left Beirut by sea for Egypt on the 11th December, and my last impression of Syria was the wonderful rose-coloured sunset glow on the snow summits of the Lebanon range overlooking Beirut, for although the vegetation round the town itself was of a semi-tropical nature the hilltops had been covered with snow for some days.

On arrival in Egypt we were stationed in a large camp just outside Heliopolis, one of the suburbs of Cairo, and on the opposite side of the City to Mena where we had quartered on our first arrival in Egypt nearly three years earlier. Here I noticed a true malarial mosquito, *Anopheles pharoensis*, rather to my surprise, as the camp, a newly formed one on the desert, was at least a mile from the nearest standing water. During our stay here I had the opportunity of visiting the interesting collections in the Entomological section of the Ministry of Agriculture at Cairo, though I could not spend as much time there as I should have liked. In the middle of March I got my demobilisation papers and was fortunate in getting away just before the first of the native risings. I had an uncomfortable but uneventful three weeks going home *via* Taranto and Le Havre, and arrived in England again after three and a half years' service abroad just in time to spend Easter at home.

Allowing for the limited opportunities I had for entomological observations I should think a collecting trip to Palestine would prove interesting, but more so to Hymenopterists and Dipterists than to students of other orders. The Jordan Valley in the spring would I believe well repay a collector, and the plains and more fertile portions of Palestine would likewise be attractive, but one would have to go in the earlier months of the year, and I certainly endorse Major Graves' general remarks in his article on page 64 of the *Entomologist's Record* for 1919 as to taking precautions against malaria and snakebite.

Seasonal Polymorphism and Races of some European Grypocera and Rhopalocera.—Additional Notes.

By ROGER VERITY, M.D.

(Continued from page 8.)

Agriades coridon, Poda, form *SAMSONI*, mihi, and *A. thetis*, Rott., ab. *PETRI*, mihi, and *polonus*, Z.—Some years ago Ing. Samson of Lyons sent me two male *Agriades*, which he had collected on June 16th, 1907, at the "foot of the Grand Salève," near Geneva. As nothing has been published about them, to my knowledge, and as I cannot come in touch again with Samson since the war, I think it advisable to make this extremely interesting form known from the specimen which has remained in my possession. At first sight the upperside colouring, of a brilliant electric blue, similar to the brightest and less violet specimens of the southern races of *thetis*, and the early

* The specimen referred to was in perfect condition. Mr. A. H. Jones, who kindly identified it for me, stated that the date was of interest as according to Seitz the species emerges in February and March.

date of capture, answering to the first generation of the latter, would strongly suggest its belonging to it. A more accurate inspection, on the contrary, quite satisfies one that it is nothing but a *coridon*, similar to the Asiatic race *caucasica*, Led., and that it exhibits no traces of *thetis* characteristics, except the two mentioned above. It differs markedly in this both from the description of *polonius*, Z., and of *calydonius*, Lowe (Wheeler, *Butt. of Switz.*, p. 31); the former is described as having the underside of *thetis*, which, in Central European races especially, is very different indeed from that of *coridon*; the description of the underside of the latter points to the same conclusion. The underside of my specimen on the contrary does not differ in the least from that of other *coridon* collected higher up on the Grand Salève in August. The shape of the wings and the fringes are also as in this species and so is the marginal black pattern of upperside, although, in *coridon*, specimens with this pattern as reduced in extent are scarce; the premarginal spots are quite large on both fore- and hindwing; they nearly stand out completely from the narrow marginal streak even on the forewing and the latter extends along the neurulation in thin sharp points. Except for the epoch of emergence, there would be no reason to suspect a hybrid; the existence of *caucasica* in the East seems to point to a phenomenon of hypermorphosis rather than to any other; precocious emergence supports this view. I leave it to the numerous and clever Lepidopterists of Geneva to find out whether this form is constant or frequent and to better work it out, as it well deserves.

The two specimens found by Keynes in the Pyrenees in June seem from his description (*Ent. Rec.*, xx., p. 178), to be like the Geneva ones.

A stroke of luck gives me a chance of comparing the specimen described above with what seems to be exactly Zeller's *polonius*: O. Querci, collecting in the Alpi Apuane (N.-W. of Tuscany) and precisely at Careggine (m. 1000), captured a few days ago (mid-June, 1920) two abnormal male specimens, which were flying with no more than half a dozen normal *A. thetis*; no others of this species have been seen in that district and no *coridon* has, of course, appeared yet, its period of emergence only beginning at the end of July. These specimens are smaller than *samsoni*, corresponding to the size of *thetis* in their locality; the wings have exactly the rounded shape of the latter and the underside pattern does not differ from it either: the fringes on the contrary are a little longer than in *thetis* and are also chequered more as in *coridon*; the marginal black pattern above is fundamentally as in *samsoni*, but the narrow marginal streak gradually shades off in zone of sparse black scaling, mixed with the blue ground-colour which reaches beyond the pre-marginal black spots and on the hindwing vaguely shadows a series of pre-marginal lunules; thin nervural streaks stretch far beyond it on all the wings; the spots are large and shade gradually in the said blackish zone; the ground colour is not as brilliant as in *samsoni* or *caucasica*, but duller and heavy, and the blue is of an extremely cold tinge, distinctly greenish. As Zeller's *polonius* in the original description is said to have "on the upperside a ground colour combining the blue of both species ('midway between *adonis* and *corydon*'), but with the marginal markings of *corydon*, whilst on underside the colouring and marking is that of *adonis*," that name

seems to suit my specimens admirably. I must, however, state my distinct impression that they are in no way hybrids, but simply an aberration of *thetis*; the diffused marginal pattern and the tone of blue probably recall the aspect of *coridon* by some factor having interfered with their normal development; it will be remembered that a greenish colouring and a broad shadowed marginal band and nervural streaks are to be seen on the wing in the chrysalis of *thetis* before emergence.

I should thus conclude that most of the supposed hybrids are either hypermorphic *coridon*, having progressed towards *thetis*, or hypomorphic *thetis*, having stopped in their development at a stage resembling *coridon*.

A third aberration, quite distinct from the two just described, is represented by two specimens collected near Florence many years ago by the late Prof. Pietro Stefanelli and now in his collection; they are mentioned by him in the *Bull. Soc. Ent. Ital.*, xxxii. (1900); one he found at the end of July in the plain, where *thetis* and *aragonensis* have a generation in June and one in August-September; the other he found on Mount Fanna, 600m., where, besides these two species, there exists *coridon* on the wing in August, at a time just preceding their second emergence; the aberration in question was captured at the beginning of this month. Never has Querci nor have I found another specimen amongst the thousands of the three species examined from these localities. By their size and rounded wings these two specimens quite agree with *thetis*; the fringes instead are longer and chequered as in *aragonensis* and *coridon*; the marginal streak is extremely narrow and sharply defined; the premarginal spots are entirely absent on forewing and very minute on hindwings; thus, the marginal pattern is just like that of *thetis*; the ground colour is very glossy, but with a very pale colouring; in certain lights it is pale blue, somewhat as in the *corydonius* of *coridon*, in others it is silvery white, with a greenish tinge. As regards the underside, it must be remembered that *thetis* race *etrusca*, *aragonensis* race *florentina*, and *coridon* race *apennina* differ much less from each other on that surface than do these species in other regions, and that specimens occur which it would be impossible to ascribe to the right one, without the aid of the upperside characters. Stefanelli's aberrations belong to the latter, but, if anything, resemble *aragonensis* and *coridon* rather than *thetis*, on account of the thickness of the premarginal black lunules; the forewings are whitish, the hindwings pale fulvous, as in most Tuscan *Agriades* of the second generation. I propose naming this lovely aberration *PETRI* in memory of its discoverer. It seems to come nearer being a hybrid than *samsoni* and and Querci's *polonus*, both by its aspect and time of emergence, but in this case the specimen found in the plain, where *coridon* does not exist, would show that the cross had been between *thetis* and *aragonensis*.

With *calydonius*, Lowe, the ambiguous *polonus*, Z., of past authors has thus now been split up into four distinct European aberrations.

[I have received from Dr. Verity a request to add a note with regard to the five specimens which I took at Assisi in the summer of 1909 and which I described as *polonus*, Zeller, and regarded as hybrids between the two species *coridon* and *thetis*. The upperside of all five, though slightly differing in shade (due, I think, to their different degrees of freshness), is of a colour about midway between the blue of

the two species. The black marginal line is sharply defined, as in *A. thetis*, though somewhat broader, but two of the specimens show traces of black spotting within, but detached from, the border of the forewings, and similar traces are discoverable with a lens in the other three, these spots are more definite on the hindwings, in varying degrees, but resemble those of *thetis* rather than those of *coridon*. The fringes are distinctly those of *thetis*. The underside resembles that of *coridon* in the difference of ground colour between the fore and hindwings, but this difference is less marked than in specimens of *coridon* from Assisi. The spotting of the underside, except at the border is on the whole nearer to that of *coridon*, whilst the border is somewhat nearer to that of *thetis*, but the five specimens differ slightly in both these respects. The wings of all are decidedly nearer in shape to those of *coridon*.

It must be remembered that of these five specimens three were taken on the slope above the cemetery road on June 28th and July 1st and 2nd, amongst numerous specimens of *thetis*, and the other two on July 19th and 24th on the road to Piano del Pieve amongst comparatively few specimens of *coridon*, *thetis* then being quite over. The freshest specimens were those taken on July 1st and July 24th. I never saw *thetis* on the *coridon* ground nor vice-versa, but the two are scarcely half a mile apart. The dates of capture and the accompanying species would seem to point to three of these specimens being aberrations of *thetis*, and two being aberrations of *coridon*, but as they are practically indistinguishable, I am still of opinion that probably all are hybrids. The date of capture of Dr. Verity's Geneva specimen seems to me to preclude the possibility of its being an aberration of *coridon*, and I have little doubt that all the specimens he mentions are actually hybrids, the differences between them being just what might be expected (judging from hybridism in other cases) on this supposition. Otherwise, the only plausible theory would seem to be that all are instances of atavism, in which case three of my five Assisi specimens would actually have *thetis* as their immediate proprietors and the other two would be the direct offspring of *coridon*. This is no doubt a tenable theory, but the other seems to make a less demand on our credulity.—G. WHEELER.]

Agriades thetis, Rott., race ETRUSCA, Vrtý., mixed gynandromorphs.—I must record the capture of two specimens last summer in Central Italy: one on June 10th in the Mainarde Mts. (Caserta), the other in August near Florence. In the first the right hindwing is quite female with large lunules; the forewings and the left hindwing are a little smaller; they have no premarginal lunules and they are streaked with bright blue male scales, including androconial; the underside is entirely male. The second specimen may be described as a normal-looking female on both surfaces, but with abundant blue male scaling above, chiefly on right fore- and left hindwing, which is nearly entirely blue and has no lunules as far back as the median nervure and then abruptly becomes female beyond.

Gynandromorphs are still rarer in the South of Europe than they are northwardly. O. Querci in 34 years, collecting on a large scale, has only met with a *Celastrina argiolus* near Milan, now in the Rostagno coll. in Rome, and with a *Plebeius argus* in the Sibillini

Mts., now in the Oberthür coll. ; Stefanelli in 40 years has only found one *thetis* similar to the ones described above ; and I have never come across any specimen, except a *Polyommatus icarus* sent to me from Modena. This is probably due to the much greater scarcity of aberrations in general : Querci has only met with cases of nearly total melanism in an *Issoria lathonia*, captured in Rome when he was a boy and sent to Staudinger, and in two *Melitaea athalia* from the Isle of Elba, now in my possession.

*Agriades *hylas*, Esp., race CORREPTA, mihi.—The nymotypical race is from Saxony ; it is large (32-34 mm.), the markings of the underside are prominent, the background is dark gray in the male and of a very dark blackish-brown in the female ; examples exactly corresponding to Esper's figures are found also in the Alps. In Central Italy, instead, there exists a variation similar to that of other species : the size is smaller, the build frailer, the underside is never as dark as in the nymotypical form, the markings are slightly reduced and the female never shows traces of blue scaling above ; except for the size, these characters, however, are not as marked in a general way as in other *Agriades* of the same region. The first generation, in Tuscany, in the Sibillini and in the Mainarde, varies from 25 to 29 mm. in expanse ; the second rarely reaches 25 mm., generally measures 22 to 24 and often is as small as 21 ; the latter corresponds exactly to Hübner's *golgus*, although his "type" was from Spain ; for the Italian first brood I propose the name *correpta*, the second should, I think, be called *golgus*. If both the broods of Spain and Italy are found to be identical, the name *golgus* should, of course, be used for the race and *correpta* limited in both regions to the first brood.

*Agriades *escheri*, Hüb., race ALTIVOLANS, mihi.—At high elevations (m. 900) and also in localities less high, but in which mountain races occur, in Tuscany and Central Italy generally, there exists a race of *escheri* distinctly different from the one of the plains, although extreme individual variations here may resemble it. It recalls the race *rondoui*, Obth., of the Pyrenees, by its small size and by the minute spots and lunules of the underside ; it differs from it, however, by the more vivid blue of the male, similar to that of race *splendens*, Stef., of the Italian plains, by the orange lunules of the upperside of the female, which are just as extensive as in *splendens* and not reduced or absent, as in *rondoui*, and finally by the very clear and often perfectly white underside of the male. "Types" from Firenzuola, m. 500, near Florence. Females with a blue suffusion are more frequent in the mountains, just as is the case in France. In *splendens* the underside has usually the same gray tinge in the male and the spots are about the same size as in Hübner's figures, but the upperside is of a much colder, clearer and more vivid blue.

Polyommatus meleager, Esp., race MACRA, mihi.—In the lower localities of Tuscany this species does not differ from the nymotypical race of Saxony. At very high altitudes, such as Prato Fiorito, m. 1000, it is smaller ; the females are notably darker, the dark scaling

* *Hylas* and *escheri* are not generally considered *Agriades*.—Hx. J.T.

being much more diffused, but the extreme form *steeveni*, Tr., has never been met with in Tuscany. The race of the Sibillini Mountains, at 1200-1300 m., has all the characters mentioned more markedly, and besides here a few females have been found with characters intermediate between the form *steeveni* of the Alps, entirely covered over by brown scaling, and the form *ignorata*, Stdgr., of the East, in which the background is white and there are brown nervural bands; in my Italian specimens the white shows through a thin veil of brownish-gray scales and there exists no trace of blue: ♀ form *SQUALIDA*, mihi. The race *MACRA* is also found in the Mainarde Mts. in South Latium and in the Madonie in Sicily. One of the males from the locality last mentioned, sent to me by Ragusa, is identical with *versicolor*, Rühl, of Asia Minor, by its very pale milky blue and by its underside with marginal spotting extremely indistinct; transitions to this form are met with in Tuscany as individual variations.

Polyommatus icarus, Rott., race *ZELLERI*, Vrtý., subrace *RASA*, mihi.—From July 10th to 18th, 1919, in the Mainarde Mts., at 500m., several males of the second generation were collected of a form quite new both to Querci and myself, although we have examined thousands of specimens from all sorts of localities; in some of these individuals the usual grey colouring of the underside of the wings is entirely absent, leaving the pure white ground colour quite uncovered; the result is that the white rings round the spots and the triangular space of hindwing, etc., where usually the white only shows, do not exist; in other individuals the grey is more or less faintly present. This evidently is the corresponding form to ab. *detersa*, Vrtý., of *A. thetis* (except for marginal black spots not absent, as in the latter) and to form *INFRACANDIDA*, Vrtý., of *Aricia medon*. I do not think the Mainarde specimens are simply due to an aberrating family, accidentally hit upon by the collectors, for in the same locality all the *Agriades* are remarkably light-coloured on the undersides, so that some geographical factor probably exists.

Aricia medon, Hüfn.—This species produces tolerably marked variations according to latitude and altitude and a few characteristics proper to certain regions, but individual variation is always very broad so that races are always undefined. Its variations can be summarised and described with comparative ease, but, unfortunately, the literature dealing with them is so vague and confused that we are met by considerable difficulty in making use of existing names. Tutt has, with admirable patience, collected all that has been published on the subject, but one feels the need of a brief synopsis and conclusion, definitely fixing the races which can be discerned at the present moment. I will attempt to expose what I have made of it as shortly and clearly as possible.

Tutt's conclusion that the specific name should be that of Hüfnagel is evidently correct; the nymotypical race is consequently the one of Berlin. Besides the two distinctly characterised and localised races *artavereæ*, Fabr., with the transitional *salmacis*, Steph., from N. Britain, and *montana*, Rühl (= *nevadensis*, Obth.), from high altitudes in S. Spain, there only exist in Europe, broadly speaking,

two races: one in Central and one in S. Europe. The proportion between the numbers of the various individual forms varies however a great deal in the different localities and changes distinctly the aspect of series of specimens from each, so that several SECONDARY races are discernible in both the PRIMARY ones mentioned above. As classification is mostly conventional and only a practical way of memorising the complexity of facts (so much so that even a satisfactory definition of "species" has not yet been given), I think the terms of "primary," "secondary," etc., races or groups of races can very well be used to express the successive subdivisions which are met with in nature in certain species, when regions gradually lesser in extent are considered, such as in this case; the term "subspecies" I should restrict to particular groups of races which only just fall short of the definite group we call "species"; species axiomatically are supposed never to blend, subspecies sometimes blend, races always blend (see "Introduction" to *Rhopalocera palaeartica*).

(a) The race or group of races of Central Europe is distinguished by its elongated and pointed wings, with the external margin straighter, by its fringes of a purer white, by the more or less frequent occurrence of the individual form with no orange lunules above, which is never found in the South, by the average lesser extent of these lunules, by the underside nearly invariably grey, vaguely tinted with fulvous, and thus much less variable than in the South except in *aestiva* and in *gallica*; it only has one or two generations.

The nymotypical individual form is one of small size, "with the upperside entirely brown" and no orange lunules, described presumably from the second brood (July) of Berlin. The extreme opposite individual form is *agestis*, W.V. ("types" from Vienna), "with complete border of spots," to use the words in the original description; *astrarche*, Brgst., is a synonym of this. The group of races of Central Europe consists in these two forms and in all the intermediate gradations, including *semi-allous*, Harrison [*Ent. Rec.*, xviii., p. 286 (1906)] ("types" from Durham) with "the row of red spots above becoming obsolete," but otherwise "as in *P. astrarche*." According to localities one of these forms predominates and gives series of specimens a characteristic aspect, which may be designated by the name of that form. A fourth race makes its appearance when the second generation acquires a distinctly different look from the first, owing to the underside being markedly fulvous in tinge. Staudinger has given [*Hor. Soc. Ent. Ross.*, vii., p. 52 (1871)] the name "*aestiva meridionalis* to those specimens of the second brood of Greece and of the rest of S. Europe, especially of female sex, which have the underside of a deep grey-brown colouring." Staudinger in his *Catalog* of 1901 makes of his *aestiva* a synonym of *calida*. Rühl keeps it distinct and gives Baden and Haute Garonne amongst its localities. Tutt notes that Staudinger does not mention the broad orange lunules of upperside, which are a characteristic of *calida*, so that his name can quite well be adopted for summer specimens with lunules not extensive, which are much more abundant in the South than might seem from Staudinger's words, which is not rare in the warmer parts of Central Europe and which reaches, as a rare aberration, even the North of England. I should call *aestiva* the race in which this form is abundant in the second brood, even if still mixed with *agestis*, and in which *gallica*

never occurs and still less *calida*. Finally Oberthür has named *gallica* [*Ét. Lép. Comp.*, iv., p. 252 (1910) and x., fig. 2374-6], using as "types" specimens from Cancal and from the Morbihan of the second generation, that form in which the lunules above are very extensive, considering it is of the Central Europe race, and the underside of the female is of a more fulvous gray than usual in that region; its rather large size and the shape of the wings also show that *gallica* is a transition to the southern race and this name will no doubt be useful to designate that particular race and intermediate grade, although, strictly speaking, it would be included in the descriptions of *agestis* and of *aestiva*, and it would only be their culminating form; Oberthür, creating his name, has unconsciously restricted the other two to the common, less marked, forms. Concerning the Alpine races, let us observe that the form with no orange lunules above gets more abundant as altitude increases and that the underside becomes of a darker gray. Ever since Staudinger in 1871 restricted the name of *allous*, Hüb., to this author's figure 990, which has no trace of lunules, the name has been used for the Alpine form with this characteristic. The revival of the name *medon* reduces *allous* to a synonym, but Tutt would evidently like to save it by observing that *medon* is particularly stated to be small, whereas *allous* may be large or even very large; as size is very variable and never acquires racial importance in this species the distinction seems rather too subtle. The commonest Alpine form is *semi-allous*, Harr., and it is mixed with different proportions of individuals without lunules or with broader lunules, according to localities. Tutt proposes to use the name *alpina*, Stdgr., for those individuals found at high altitudes and in the far North, which are of a particularly deep black and small, because Staudinger says that "a small Alpine form is interesting, in which the male is always quite dark on the upperside." In my opinion the "quite dark" means devoid of lunules, and the proof of it is that Staudinger in 1901 classifies it under *allous* with a "var." which probably was suggested by the small size; *alpina*, I think, is but another synonym of *medon*. Why not admit that the revival of this name has rendered two of the former ones useless, rather than try and refer them to races and forms which their authors never had in mind?

(b) The race of Southern Europe, broadly speaking, is characterised by the broader and rounder shape of the wings, by the external margin being more convex, by the fringes being more markedly brown, by the complete absence of individuals with no orange lunules above, by the more or less frequent occurrence of some with very extensive lunules, so that the medium extent is markedly greater, and by the underside, which exhibits a distinct dimorphism between the first brood and the two summer ones: these two seasonal forms branch off in opposite directions from the Central Europe race, because in the first brood the underside becomes of a very cold grey tinge (with no trace of fulvous), except in rare individuals, and the gray is often pale and sometimes very pale or nearly white, showing it is a transition to *sarmatis*, Gr., of Russia, to *infracandida*, Vrtý., of Syria, etc., whilst in the second and third broods the underside becomes markedly fulvous in both sexes and the basal suffusion of bluish scales disappears, as in *icarus*, *theristes*, *thetis*, etc.; in all the broods individual variation is much greater than in Central Europe; three broods are produced at all altitudes.

Local varieties consist, just as in Central Europe, but more markedly, in the extent of the orange lunules and in the colour of the underside; the different grades of these two characters produce a few secondary races by combining in different ways.

I think one should in the study of European races, leave aside the Erschh. (1821), which was given to the race of the Canary Islands and which is figured and described in a different way, so that it is impossible to fix the brood it belonged to. Broadly speaking the name of *ornata*, Stögr., is, in consequence, valid for the first brood and that of *calida*, Bell., for the two others of the South. More exactly one finds that the first has been given to the individual form from Tunis with the underside of a "light grey, as in ordinary *astrarche*" and "with a wide reddish band of marginal spots above," found together with other forms "scarcely differing from the usual form." Staudinger adds that this special form was abundant in Sardinia and that he possessed it from Cadiz and Corsica. From this one can conclude that the name should be used for those races whose first generation has the broadest lunules; it is met with precisely in those localities and to it belong also nearly all the Sicilian specimens collected by the Quercis at Monreale, 800m. above Palermo, during the whole of May, and by Ragusa on Mount Pellegrino, at the beginning of April. Oberthür figures 2381-2 [*Ét. Lép. Comp.*, x.] show well the extent of the lunules, but the underside is darker and the size greater than in the Sicilian specimens. In Florence and other localities of Tuscany and Central Italy the culminating form never occurs and the average extent of the lunules is distinctly less; the whitish underside on the contrary does not differ from that of the Sicilian examples. I should name this form *SUBORNATA*, taking as typical my series of the Pian di Mugnone and more exactly that individual form in which the first lunule is absent, so that five are left on the forewing. In Syria (my "type" is from Beyrouth) and in Asia Minor (see Tutt, p. 254) the prevailing or only form is the most extreme variation in the *ornata* line, on account of the extent and brightness of the lunules on both surfaces and on account of the underside being of a perfectly pure white. I should name it *INFRACANDIDA*. In *sarmatis*, Gr., from S.E. Russia the underside is of a less pure white tinge, there are no lunules above and the wings are more elongated. It is well worth naming *INFRALBENS* those individuals ("types" in my coll. N. 10 and 24) which have a whitish underside and differ thus from the nymotypical form of *ornata*, in which it is of a comparatively dark gray colour, similar to *agestis*, and such as was described by Staudinger and well figured by Oberthür. Needless to say that no confusion is possible between form *infralbens* and ab. *albicans*, Aur., a true aberration.

In the two summer generations there exist two principal forms, which constitute very distinct races. Form *calida* was described in 1862 by Bellier, from Corsican specimens; in his description the following points must be emphasised: "the darker colouring of upperside," "the larger and brighter orange spots," "the darker fringes" and the "underside of both sexes, but particularly of female, which is striking on account of its very marked brick-red tinge."

Rühl, in *Pal. Gross-schmett.*, p. 759 (1895), gives the name of "var. *montana*" to "large specimens with very little red on upperside, and

with a rather light underside," which fly in Andalusia. Tutt remarks that this can only be the fine race, well described and figured by Oberthür under the name of *nevadensis* [*Ét. Lép. Comp.*, iv., p. 250, and x., fig. 2372-3], which in consequence sinks in synonymy. This form stands exactly opposite to *calida* by its extremely reduced lunules and by its poor colouring on both surfaces.

In Tuscany there exist precisely two extreme opposite races, which correspond to the two variations just mentioned (the series in my collection which better represent them are respectively from the Isle of Elba and from Florence) and intermediate gradations, according to localities. To the Elban race the name *calida*, Bell., is well suited, and so it is to the similar one I have collected in August at Tempio in Sardinia. The underside variations are at Elba very extensive in both sexes, but more marked in the female: besides the nymotypical individual form of *calida*, which I should describe as being of a very bright reddish fulvous, rather than of a "brick-red," as does Bellier, and besides the *pallidefulva* form (described below), the following are noteworthy: A form of a dark leaden gray, nearly entirely devoid of fulvous mixture, found in both sexes in June, at the beginning of the second generation and which I should call *INFRAPLUMBEA* (types N. 61 and 79, easily distinguishable from late individuals of the first generation by the absence of bluish scales at the base of wings); a form of a very dark chocolate-brown, evidently produced by the combination of the fulvous of *calida* with the gray of the preceding (form *INFRACACAOTICA*; types N. 64 and 78 of my series); a few other specimens are identical with *gallica* and with *æstiva*, as regards underside colouring, and many correspond to them by the extent of the orange lunules on both surfaces.

Most of the individuals of the two summer generations from Florence differ markedly from the Elba race by their slightly larger size and by the much paler and duller colouring on both surfaces, which produces, in extreme examples, a strong resemblance to *nevadensis*, as figured by Oberthür (fig. 2372-3*); from the latter they differ however by their smaller size, by never being equally pale and dull and by the breadth of the lunules above, considerably more extensive than in *calida* from Elba, instead of much more reduced, as in *nevadensis*. The Florentine specimens, compared to the Elba ones, can be described as follows: the upperside is not of a blackish-brown, but of a brown inclining to fulvous; the lunules are not of a bright reddish-orange, but of a more yellowish and duller tinge on both surfaces; they are markedly more extensive in both sexes; the underside is of a very pale *café-au-lait* inclining to fulvous in the majority of the males, and of an extremely pale fulvous (sometimes slightly pinkish) in the extreme examples of that sex and in the majority of the females. It must be noted that this pure and light fulvous colour is evidently due to the absence or the paleness of the gray, already described in the form *infralbens*, Vrtý., of the first generation, who's "types" belong precisely to the same race. I should adopt for the entire race the name of *PALLIDEFULVA*, which I give to the summer

* Judging by these figures, my impression is that this *montana*, Rühl (= *nevadensis*, Obth.), should be grouped with *Aricia ramburi*, Vrtý. (= *idas*, Ramb.), if the latter be a distinct species from *medon*; Chapman, however, has not found a marked difference between *ramburi* and *medon* even in the genitalia.

generations. Specimens of the other forms described above, when speaking of *calida*, are found in small numbers also in the neighbourhood of Florence and vary according to localities. Form *calida* seems to be produced by damp heat and form *pallidefulva* by dry heat.

In many Tuscan localities a race is found certainly very different from *pallidefulva*, but which, on the other hand, cannot be referred to *calida* either, because individuals with a very bright underside are wanting. It may be described as an intermediate grade between *gallica*, Obth., and *calida*, Bell., mixed with a few individuals transitional to *pallidefulva*. I propose calling it *SUBCALIDA*, taking as typical my series from the Valleys of the Fegana and of the Camaione, m. 350-550, near Lucca. It is probably the commonest and most widespread race in Central and Northern Italy.

At the highest altitudes reached by *medon* in the Tuscan Apennine, such as Prato Fiorito, m. 1000, and Abetone, m. 1300, the two summer generations correspond to grade *gallica*, Obth. In the Sibillini Range, at m. 1200, where the fauna has a more Alpine aspect than in the arid Tuscan mountains, also *medon* displaces itself of one grade in variation and produces a perfect *agestis*, with only two generations, with elongated wings, with the underside of a gray inclining to fulvous in many specimens of the second or summer brood, and with bluish scaling at the base of wings also in the latter brood, which consequently often differs in no way from *aestiva*, Stdgr.

The following Table summarises what has been said above. It will be noticed that the leading characters of the races are very limited in number. I have endeavoured to show at a glance, by letters and figures, how the various combinations of their different grades characterise the races; their meaning is explained below.

Annuals: Northern Europe, North of the Isothermal line of 49°.

C ₅ . B ₁ . A ₀ . 0-II.	Race <i>artaxerxes</i> , Fabr. (Scotland).
C ₅ . B ₁ . A ₁ . 0-II.	Race <i>salmacis</i> , Steph. (Northern England).
C ₄ . B ₀ . A ₂ . 0.	Race <i>medon</i> , Hüfn. (= <i>allous</i> , Hüb., fig. 990).
C ₄ . B ₀ . A ₂ . I.	Race <i>semiallous</i> , Harrison.

High altitudes in the great mountain ranges of Central Europe.

C ₅ . B ₀ . A ₂ . 0.	Race <i>medon</i> , Hüfn., (= <i>allous</i> , Hüb., fig. 990, = <i>alpina</i> , Stdgr.).
C ₅ . B ₀ . A ₂ . I.	Race <i>semiallous</i> , Harrison.

Bigenrates: Northern Europe (South of isothermal line of 49°) and Central Europe. Also high altitudes in the great ranges of Southern Europe.

(C ₁) ? 0.	Race <i>sarmatis</i> , Gr.-Gr.,	I. gen. <i>sarmatis</i> .	II. gen. ?
C ₄ . B ₀ . A ₂ . 0.	Race <i>medon</i> , Hüfn.	„ <i>medon</i> .	„ <i>medon</i> .
C ₄ . B ₀ . A ₂ . I.	Race <i>semiallous</i> , Harr.	„ <i>semiallous</i> .	„ <i>semiallous</i> .
C ₃ . B ₀ . A ₃ . II.	Race <i>agestis</i> , W.V. (= <i>astrarche</i> , Brg.)	<i>agestis</i> .	„ <i>agestis</i> .
C ₃ . B ₁ . A ₃ . III.	Race <i>aestiva</i> , Stdgr.	„ <i>agestis</i> .	„ <i>aestiva</i> .
C ₃ . B ₂ . A ₄ . IV.	Race <i>gallica</i> , Obth.	„ <i>agestis</i> or <i>subornata</i> .	„ <i>gallica</i> .

Trigenerates: Southern Europe and Mediterranean Region.

C ₂ . B ₃ . A ₄ . V.	Race <i>subcalida</i> , Vrtý.,	I. gen. <i>subornata</i> , Vrtý.,	II. and III. <i>subcalida</i> .
C ₂ . B ₄ . A ₄ . VI.	Race <i>calida</i> , Bell.,	I gen. <i>ornata</i> , Stdgr.,	II. and III. <i>calida</i> .
(C ₁) ? A ₄ . VI.	Race <i>infracandida</i> , Vrtý.,	I. gen. <i>infracandida</i> ,	II. and III. ?
(C ₀) B ₂ . A ₄ . VI.	Race <i>pallidefulva</i> , Vrtý.,	„ <i>subornata</i> ,	II. and III. <i>pallidefulva</i> .
C ₀ . B ₁ . A ₄ . I.	Race <i>montana</i> , Rühl. = <i>nevadensis</i> ,	Obth. (S. Spain).	

The ordinals in Roman figures represent the various grades in the extent of the orange lunules on upperside, which cannot be indicated with more accuracy, by stating the actual number of lunules present, because their size varies more than their number and has more importance in the look of the insect. In this, as in the following characters, it should be understood that the grade indicated is that of the medium individual variation, but that the latter is, as a rule, so extensive as to include various grades. The different variations of the underside of the wings, which constitute the leading characters of the various races, are represented by letters and the different grades of each by arabic figures, beginning by O where the character is absent: A=size of black dots; B=brightness of fulvous tinge of underside in the single generation of *artaxerxes* and of *salmacis*, and in the second and third generations of the other races; the gray colour, with which it is generally mixed, may be more or less dark, or even absent in the various individual variations; C=medium of the different individual variations in the intensity of the gray of underside; the total absence of gray (C_0) as well as of fulvous (B_0) does not figure in the table, because this combination only occurs in extreme individual forms, exactly as the extreme nymotypical form of *infracandida* does not occur as a race, because the medium intensity of the race corresponds to grade *infralbens* (C_1); in the case of race *sarmatis* and in that of race *infracandida* the grade of the first brood figures in brackets in the Table because the following broods are unknown to me, and in the case of race *pallidefulva* that of the II. and III. brood is also in brackets, because in this race seasonal dimorphism is more marked than in the others, in this particular character (C), and the first brood has a different (C_2) grade of gray, so that the grade indicated does not refer to all the broods, as in the case of the other races.

This Table shows clearly that the vast majority of the more widespread races consist in gradations of only one series of variations, from *medon* to *infracandida*, similar to those of *A. thetis*, of *P. icarus*, etc., and that only a few local races stand apart. Experimental breeding would probably show, as in the case of *R. phlaeas*, that the series only consists of ontogenetic races produced by the direct action of surroundings on individual elasticity, or perhaps that a slight degree of hereditary differentiation exists between the extremes of the series; a positive fact is that no sign of a "transverse scission" is perceptible at any point of the series. On the contrary scissions are clearly discernible, which might, by a material image, be called "longitudinal" in respect of the direction of variation just mentioned, and which cause a division of the two extremes of the series in "collateral" divergent branches. That *artaxerxes* is not simply produced by a further continuation of the variation which leads up to *medon* seems to me clearly shown by the fact that it is never found as extreme individual variation even in localities where form *medon* is most abundant as compared to the other forms, and by the fact that the fulvous colour is often more accentuated than in the latter both by the extent of the lunules and by the tinge of underside, which can reach the grade of *agestis* and even of *aestiva*; at this level in consequence one suspects that the branch of *semialbous* and *medon*, and that of *salmacis* and *artaxerxes* have separated. It must be noted that the disappearance of the black dots below cannot be entirely due to a

degenerative cause, for in other *Lycaenidi* it is found elevated to the rank of a specific character (*pheretes*, etc.); it would rather seem an indication of a state of organic equilibrium adapted to live in Arctic or very damp climates.

Race *sarmatis*, Gr., is from the mountains of Southern Russia; it has no orange lunules above and the underside is light gray. Staudinger and Seitz make what would be an *infracandida*, Vrtý., of it, but Tutt has examined the "types" in the Brit. Mus. and cleared up what Grum meant.

Anyone can easily see that *pallidefulva* and *montana* stand outside the gradation which leads from *medon* to *calida*; in this continuous series there exists a tolerably constant proportion, in the medium of individual variation, between the grades of the different characters, both when they progress in a parallel fashion (extent of lunules, brightness of fulvous, etc.) and when there is an inverse proportion (characters just mentioned and intensity of gray below), although individual variation is broad. Form *pallidefulva* may be found in certain localities mixed with individuals belonging to the main series, but in others it constitutes a distinct race, not very variable; it stands out sharply on account of a very accentuated difference in the proportion between the grades of the different characters: by the extent of the lunules it is equivalent to the higher grades *calida* and *infracandida*; by the entire, or nearly entire, absence of grey mixed with the fulvous it is also equivalent to the latter or to *infralbens*, as also to the individuals of *calida* with a very bright, but very pure, fulvous underside; on the contrary by the tinge of the lunules on both surfaces and by the tone of the fulvous of underside it is equivalent to the lower grades *gallica* and *aestiva* and to this it adds an exceptionally light and reddish upperside on account of the strong reduction of the black. In *montana*=*nevadensis* these characters are still more accentuated, except the extent of the lunules, which is extremely small on the upperside and also on the underside, so that a form transitional to *A. ramburi*, Vrtý.=*idas*, Ramb., is the result, although this is considered a species distinct from *medon*.

This example of *medon* seems to show that individual variation may include differences in the proportions between the grades of the different characters, but that in such cases "specific elasticity" gradually comes into play and tends to produce stable phylogenetic races, which by a further displacement of the centre of balance may originate subspecies and perhaps even species. Although this last conclusion would have such an enormous importance in the *revata questio* of the origin of species that one scarcely dares admit its possibility, I must say that the more my acquaintance with variation in the Lepidoptera increases the more examples I find of extraordinary resemblance between species. I find that related species, perfectly distinct at one end of their series of geographical variations or in one of their annual generations, often are so similar in the opposite variation or in another generation as to be quite difficult to separate from each other. As, for the present, we are only able to establish specific distinction on the ground of morphological characters, such resemblances at one end of divergent series may, I think, be worthy of careful consideration.

(To be continued.)

NOTES ON COLLECTING, Etc.

ABRAXAS SYLVATA.—I shall be glad of any hints as to rearing this species from those of your readers who have been successful in the matter. Under what conditions can one get the pupæ safely through the winter? With me they invariably die.—(Rev.) G. H. RAYNOR, M.A., Hazeleigh Rectory, Maldon.

A NEW LOCALITY FOR DRYOPHILUS ANOBIOIDES, CHEVR., AND SOME OTHER COLEOPTERA FROM FRECKENHAM AND BARTON MILLS.—Early in May, 1916, Dr. Nicholson discovered *Dryophilus anobioides*, Chevr., in abundance on a patch of broom at Freckenham, Suffolk; and three weeks later Mr. Allen visited the place in his company and found the beetle still present but less plentiful. They having kindly told me where to look for this rare insect at Freckenham, I went there on May 17th last; but found most of the broom dead. I only secured two specimens of the *Dryophilus* from a single plant which was broken, but still living. Remembering that I had seen a fine large clump of broom at Barton Mills I determined to try there, and on May 18th I found the beetle to be in great abundance in this new locality. This beetle, judging from the few records of its capture with us, appears to be very rare in Britain. Fowler only gives Plumstead, Coombe Wood, and Chobham, which are all very old records. Rudd recorded it from Coombe Wood in 1834 [*Ent. Mag.*, 2 112 (1834)]. The only recent capture known to me, previous to Nicholson's was made by Dr. Joy at Bradfield.

It may be worth while to mention some of the other beetles observed at Freckenham and Barton Mills. In the former locality: beating some large Scots firs in bloom produced *Brachonyx pineti*, Pk. (this northern species is evidently spreading in Suffolk; a few specimens had been taken near Mildenhall, Allen found it at Brandon, and it occurred to me in abundance at Barton Mills in 1917); *Cryphalus abietis*, Ratz.; *Pityophthorus pubescens*, Marsh.; *Pityogenes bidentatus*, Hbst.; *Rhinomacer attelaboides*, F.; *Dryophilus pusillus*, Gyll.; *Homalium rivulare*, Pk.; *H. concinnum*, Marsh.; *Calodera nigrita*, Man. (two specimens were taken, a very curious situation for this marsh insect): *Apion pomonae*, F., *Eumicrus tarsatus*, Müll.; *Atomaria linearis*, Steph.; and a small narrow *Epuraea*, which I have not yet been able to determine.

In some pits, whence sand had recently been dug, beetles swarmed; some of these are usually only found on the coast. *Harpalus picipennis*, Duft., not uncommon (the only other inland records known to me are Hendon, Lakenheath Warren, and Brandon. Retaken by Allen at Brandon in 1917); *Harpalus serripes*, Schon. (taken inland previously at Dartford Heath, and Harleston, Norfolk); *Philopodon geminatus*, F. (other inland records: Wellington College, Sherwood Forest, Bewdley, and Kidderminster); *Microzoum tibiale*, F.; *Orthocerus muticus*, L.; *Baris picicornis*, Marsh.; *Trachyploeus scaber*, L.; *T. scabriculus*, L.; *Strophosomus faber*, Hbst.; *Syncalypta hirsuta*, Sharp; *Notoxus monoceras*, L.; *Homalota ignobilis*, Sharp; *H. caesula*, Er.; and *H. sericea*, Muls. (Dr. Cameron kindly identified the *Homalotæ* for me); etc.

Harpalus punctatulus, Duft., was taken running on the road.

Beating dead gorse stems produced *Phloeophthorus rhododactylus*, Marsh., and its parasite *Laemophloeus ater*, Ol.; *Pityogenes bidentatus*, Hbst., and *Pityophthorus pubescens*, Marsh. (these two last species are usually found in fir).

At Barton Mills the *Phloeophthorus* and the *Laemophloeus* were abundant in dead broom stems, and nearly all the broom feeders were present in numbers: *Tychius venustus*, F.; *Apion rufirostre*, F.; *Gonioctena olivacea*, Först.; *Bruchus loti*, Pk.; and *Micrambe villosa*, Heer., in plenty; etc.

A specimen of *Tetropium gabrielli*, Weise, was beaten off broom; and *Coeliodes ruber*, Marsh., off oak. This last insect, in my experience, is decidedly rare. In all the years that I have been collecting I have only taken four specimens.—H. DONISTHORPE.

SOME LEPIDOPTERA FROM EAST TYRONE IN 1919.—A cold late spring following a fairly mild winter; the willows were not in bloom until the middle of April; the usual spring *Noctuæ* (with the exception of *Taenioctampa munda*) were all remarkably scarce.

On April 21st (a fine mild night) on the bogs near Tranmere, Lough Neagh, I did not see a single *T. opima* at the bloom, although several were netted as they flew wildly round the lamp; these and a few reddish *T. gracilis* were the total result of the trip.

Among the birch scrub at Killymoon, *Tricopteryx* (*Lobophora*) *carpinata* was much more abundant than usual at dusk.

The last week of April came in warm and sunny, and from that date till the middle of August only a few passing showers fell, although the weather for days together was dull and stormy.

In May *Euchloë cardamines* was more abundant than I ever remember and I was lucky to get some nice aberrations, including a pale yellow ♂ with the veins of posterior wings rayed with sulphur-yellow, almost a combination of *abs. flava*, Williams, and *sulfureo-venata*, Keynes; although the colour perhaps is not quite as deep as the latter aberration; a ♂ with twin discoidals to the anterior wings; several with the orange blotch suffused with dark scales and a band of dark scales along the costa into the discoidal spot; a few examples with the marginal dots on anterior wings united to each other and to the apical blotch, producing the effect of a dark border to the outer edge of the wing. By the way, there is a mistake in my last notes (*Entom. Record*, vol. xxxi., page 72); in recording this aberration I wrote "posterior" wings; what I intended to write was "anterior," thus entirely altering the meaning.

Mr. H. B. Williams in the splendid paper on this species (*Trans. London Natural History Society*) describes this form, but gives no locality; for this very distinct aberration I would propose the name *marginata*.

Nearly all the females are of the var. *ochrea*, Tutt, although a few individuals have only the discoidal area of hindwings yellow; and on May 22nd my "better half" brought to me a beautiful suffused specimen of the ab. *radiata*, Williams; on the 27th I found a specimen streaked with orange on both forewings. The greater number of these aberrations were found at rest on *Cardamine pratensis* in the evening and on dull cloudy days.

At the same time *Pieris napi* was also abundant and a number of nice banded females occurred as well as several pale yellow forms.

More *Hemaris tityus* were seen than ever before, but owing to the hot weather very shy and almost untakeable.

On May 27th, a fine still day, on the bogs at Tamnamore I found *Hydrelia uncula* flying in abundance among the sedges, together with *Euclidia mi* and *Strenia clathrata*, the latter varying a great deal; a very few *Melitaea aurinia* were also observed on another part of the bog flying over the heather; a day or two later a little moth was noticed at rest on a flower of *Cerastium* in a damp meadow—this was *Eupithecia pygmaea*, and searching around, they were found in numbers at rest on flowers or flying a few inches above the short grass, unfortunately a great many were more or less worn, but I managed to pick out a series of a dozen in beautiful condition; the few local specimens I had previously were captured flying along hedges, in the afternoon sunshine, where the Great Stitchwort, *Stellaria holostea* grows; on June 14th, another afternoon was spent on the bogs, when *Ino statice* was found at rest on Ragged Robin, and a number of the females of *H. uncula* were netted as well as *Aspilates strigillaria* and *Coenonympha tiphon*, an early date for the last insect here. About the middle of the month a search for the cocoons of *Zygaena lonicerae* was undertaken, but owing to the wind they were hard to spot in the grass, and when found often minus their contents, but all the same the wind helped to discover the robber; walking slowly among the tall grass and rushes, a Reed Bunting suddenly got up a few paces ahead, going to the exact spot I found a cocoon just torn open, but no pupa could I find. I had often suspected this bird, having seen it many times previously hovering over and then alighting in the grass, in the locality where the cocoons used to be so abundant, but was never able to detect it actually in the very act, until this season.

During the month of July several excursions were made to the Lough Neagh district especially for *Selidosema ericetaria*, but not a single example could be found after miles of bog-trotting; the only Lepidoptera seen were numerous worn and tattered *Ematurga atomaria* and some *Bupalis piniaria* in a like condition among the pines. During one of these trips, a number of Lepidoptera were found in the clutches of the Long-leaved Sun-dew *Drosera intermedia*, growing in a bog drain, these "poor unfortunates" included *P. napi*, *C. tiphon*, *E. jurtina*, and *Anarta myrtilli*, many were quite dead, an almost undistinguishable jumble of wings, others fluttering feebly, and some just entangled, which on being released were able to fly away seemingly not much the worse.

The bogs at this time were as dry as a board and covered with sun cracks; no doubt the globules of apparent moisture secreted by this plant had tempted these deluded insects to their doom; at any rate my good friend "the Doctor" and I would have fared badly had he not taken the precaution of bringing liquid refreshment in the shape of lemonade.

In its locality *E. pinephle jurtina* ab. *addenda* was not rare; I also captured several males of this aberration.

Sugar is seldom of much use hereabouts owing to the counter-attraction of numerous grasses and rushes, and this year honey-dew was everywhere, but by searching the leaves of birch trees after dark I took a number of beautifully fresh *Geometra papilionaria* as well as *Dyschorista suspecta* and hosts of other commoner insects.

A very few *Eupithecia succenturiata* were bred this month, and a few were observed flying at dusk among the foodplant, but not captured; it appears to be not uncommon locally judging from the abundance of the larvæ; but these are terribly infested with parasites, the few (four) I bred, being the sole survivors of about two dozen fine larvæ taken in the autumn. In early August *Stilbia anomala* was numerous flying over the moors at dusk in one restricted locality and a little later *Hydroecia crinanensis* fairly swarmed at honey-dew on thistles, *Cnicus palustris*, near Killymoon, as many as twenty being observed on one thistle stem, but the thistle spikes played havoc with the scales and wings, consequently only about one in ten was in good order.

About the middle of the month *Rumicia* (*Chrysophanus*) *phlaeas* was in swarms in a flax field, attracted by the honey-dew on the flax stems, in fact the whole of "the little copper" population seemed to be congregated in that field, and although I was only able to examine the edges, I captured a nice lot of aberrations, the best being one partly ab. *schmidtii* and partly ab. *intermedia*, Tutt, several brassy forms, examples with pear-shaped spots, and numerous abs. *caeruleopunctata*, Gerh.

On August 23rd, a beautiful summer day, I went with "the Doctor" to see *Spiranthes romanzoffiana* which he had found on the shore at Lough Neagh; we found this rare orchid, which in Europe is almost confined to the Lough area, abundant for some miles along the shore and growing only in boggy ground; *Aglais urticae* was very abundant at mint flowers and I took a nice variety with chalky-blue apex to forewings and the blue lunulets on hindwings obsolete.

It was remarkable to observe on the shore that the vegetation growing in the sand was burnt up and dead whereas that growing in the bog was green and fresh.

At ivy in the late autumn *Xylina socia* was abundant and *Agrotis saucia* put in a welcome appearance after an absence of some years; other autumn species were rare or absent.—THOMAS GREER, Carglasson, Stewartstown, Co. Tyrone.

CURRENT NOTES AND SHORT NOTICES.

A number of the parts of Seitz *Lepidoptera* are now obtainable from the English agents Messrs. Williams and Norgate. Seven parts are of the Palearctic *Geometrae*, which is almost finished now; the completion of the Palearctic *Noctuae* is also ready, and in addition some five parts of the Exotic portion. The price is now doubled, with an occasional double number.

Signor Querci of Florence writes to say that he has been collecting for the last month in the Alpi Apuane (Carrara), N.W. Tuscany, and that his wife and daughter have spent two months on the coast ranges of Calabria and are shortly joining him in Tuscany. He says that the Alpi Apuane is "the most interesting country I have ever met." Dr. Verity proposes to do some collecting while on his visit to the Italian Tyrol.

We hope to publish an account of the breeding of *Phryxus livornica* in the succeeding number from the pen of Mr. Hedges, who has obtained ova this spring from British-captured imagines.

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Duplicates.—*Phigalia pedaria*, melanic and intermediate forms in great variety.

Desiderata.—Numerous common species.—M. Corbett, 3, Thorne Road, Doncaster.

Mr. Donisthorpe will still be glad to receive ants and Myrmecophiles from all parts of the British Isles, and to name any such for anyone who is kind enough to send them to him. He would however suggest that ants from any other parts of the world be sent to his colleague, Mr. W. C. Crawley, 29, Holland Park Road, W. 14. Mr. Crawley is specialising on the ants of the world, and it is a matter for congratulation that we should possess an Entomologist in this country whose whole attention should be concentrated on this branch of Entomology.

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m. 1920, October 6th and 20th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E. 3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street, E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. (No Meetings in July or August.) Visitors welcomed.—Hon. Sec., W. E. GLEGG, 44, Belfast Road, N. 16.

All MS. and editorial matter should be sent and all proofs returned to H. J. TURNER, 98, Drakefell Road, New Cross, London, S.E. 14

We must earnestly request our correspondents NOT to send us communications IDENTICAL with those they are sending to other magazines.

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Journal of Variation

EDITED BY

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Platyrhinus latirostris, F., near Bristol; and a description of its larva (previously unknown). (With plate IV.).

By H. DONISTHORPE, F.Z.S., F.E.S.

On June 7th last I went down to Bristol, and my friend Mr. G. T. Gimingham very kindly conducted me to a wood in that district where he had previously taken the rare Anthribid beetle *Platyrhinus latirostris*, F. Suitable old ash trees were scarce, and the fungus *Daldinia* (= *Spheria*) *concentrica* affected by the beetle, still scarcer. The tree on which was the most fungus, and where Gimingham had recently captured a specimen, having drawn blank, we tried further on in the wood, and eventually I found two specimens of the *Platyrhinus* which were sheltering under the bark of an old ash, on which was some of the fungus. A third specimen occurred sitting on a patch of fungus high up on a tree, but where it could be distinctly seen from the ground below. My companion was so obliging as to climb the tree for me, to obtain the beetle. A day or two later I took one more specimen; again under bark.

Fowler gives the following localities for this rare beetle:—Cheltenham; Salford Priors; near Chudleigh; Swansea; Scotland, Tay district, extremely rare; and he remarks: "I know of no captures of recent years." In the supplement we add Porlock. The Rev. T. Wood took it there in 1898.

In lumps of the fungus a number of whitish larvæ (superficially like small *Scarabaeidae* larvæ) were found to be present; some very small, others larger, and one which I should judge to be about half grown.

As it was certain that this was the larva of *Platyrhinus* (no other beetle large enough feeding in this fungus), I took this specimen home with me. I find the larva of *Platyrhinus* is unknown (this being also the case with nearly all the *Anthribidae*), and therefore it seems important to describe and figure it. The only other insects found in and about the fungus were *Diphyllus lunatus* and *Mycetophagus atomarius* in abundance; *Cryptophagus ruficornis*, very rare; and a *Bracon*, which might be parasitic on any of these, but was perhaps too small to be a parasite of *Platyrhinus*.

The following is a careful description of the larva. I dissected out the mouth parts; and am indebted to Miss Tassart for the drawings.

Superficially like a small Scarabaeid larva; mandibles dark brown, apical margin of frontale of head brown gradually becoming yellow, rest of head lighter yellow. Prothorax and last two joints of legs light yellow; rest of body and legs dirty white. Body very elastic and deeply creased; usual position bent double.

Head strongly chitinous, rounded and flat on dorsal surface; *frontale* rugously wrinkled, divided triangularly from *parietale* by a fine suture; *parietale* divided by a deeper straight suture; *frontale* and sides of *parietale* furnished with a few scattered hairs; *labrum* transverse, anterior margin unevenly rounded, with rounded apical angles, somewhat narrowed posteriorly, furnished with long bristle-like hairs; *clypeus* broader than *labrum*, transverse, with rounded sides and apical angles, broadest at posterior border, anterior border emarginate; *mandibles* massive, very hard, with three teeth, the two apical ones long and pointed, smooth at apex, longitudinally rugose at base, the basal tooth short, blunt, rounded and smooth; *maxillae: cardo* short and narrow, *stipites* long, broadest anteriorly, furnished with many bristles, *lacinia* sharp, chitinous, longitudinally striate, *maxillary palpi* three jointed, basal joint ("palpiger") broadest, apical joint narrowest, pointed; *labial palpi* small, three jointed, similar in shape to maxillary

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palpi; antennae entirely wanting; ocelli small, situated near base of mandibles at apex of parietale. *Thorax*: prothorax chitinous, the prothoracic spiracles situated just above intermediate pair of legs; meso-, and metathorax soft, similar in construction to segments of abdomen. *Abdomen* fleshy, deeply creased, rounded on dorsal surface, flat on ventral surface, considerably bent in middle, with nine visible segments present, tapering towards apex; eight pairs of spiracles present, which are circular, large, and deep; anus round, surrounded by three round prominences; all the segments of the abdomen are covered with very fine widely scattered hairs (which are not shown in the figure). *Legs* three-jointed (similar in shape to maxillary and labial palpi), basal joint large, broad, furnished with a number of long bristle-like hairs, apical and intermediate joints narrow with a ring of bristles at apex.

Long.—about 12 mm. if stretched out.

On *Zygaena rhadamanthus*, Esper, with special reference to the races of its subspecies *oxytropis*, Boisd.

By ROGER VERITY, M.D.

Oberthür, in his *Ét. de Lépid. Comparée*, vol. iv., p. 586 (1910), maintains that *rhadamanthus* of the South of France and Spain, and *oxytropis* of Italy belong to the same species. I quite agree with him; when two insects resemble each other as much as these do and inhabit two different regions, and when furthermore these regions are in close proximity and the insects do not keep distinct, but overlap and blend on the boundary, I think there can be no doubt that they are both representatives of the same species. I do not see why the red collar of the *rhadamanthus* larva, absent in that of *oxytropis*, should necessarily be anything more than a variation, similar to those one observes in the imago. Oberthür observes that the *rhadamanthus* race of the Maritime Alps differs less from *oxytropis* than it does from other races of the former; the existence of this transition seems quite conclusive. I would only add that the French and the Italian races might very naturally be grouped into two subspecies, such as there are in most species of *Zygaena* when their specific limits are established on a wider scale than has hitherto been done. On comparing *graslini*, Led., of W. Asia with the *Zygaenae* in question, I find such a perfect identity of structure and wing-markings that I feel quite confident this is but a third subspecies, which completes most admirably the series of variations of the species, from *graslini* with dark scaling extremely reduced in extent, especially in its form *confluens*, Obth., to *oxytropis* race *laterubra*, and race *oxytropis*, and then on to *rhadamanthus* race *oxytropiferens*, and race *rhadamanthus*, culminating in the melanic form *kiesenwetteri*, H.S. All the wide-spread and variable species of *Zygaenae* show this scale of variation when their real, broad limits are established; see, for instance, the variations of *Z. loti* from the form *mitosa*, Cand., of its race *occidentalis*, Obth., to the extreme melanism of *calabrica*, Calb., in its subspecies *transalpina*, Esp. Another remark I must make is that no author seems to have noticed the close resemblance of *Z. anthyllidis*, Boisd., of the Pyrenees with *rhadamanthus*. I am in no way prepared to include it as another subspecies of the latter, but I certainly think it should be classified next to it and that it connects it admirably to what one might call the lowest group of species of the genus (*exulans*, *purpuralis*, etc.), whereas otherwise *rhadamanthus* would stand alone with *larandulae* or would only vaguely be connected to distant Asiatic species, such as *cambysea*, Led., through

graslini. The globular shape of the cocoon points to the same conclusion and one can deduct a closer relationship than has as yet been recognised between the group *purpuralis-erythrus* and *rhadamanthus* also by the following observation: Italy is in most species of *Zygaenæ* the country of melanic forms and races, but in those just mentioned, as well as in *Z. sarpedon* race *dystrepta*, F. d. W., exactly the reverse takes place. The group *purpuralis* produces *rubicundus*, Hb., which is the most extensively red-scaled *Zygaena* in existence; *purpuralis* produces the race *siorii*, Costantini, which in many females is as red as the rare aberration *polygalæ*, Esp., of Central Europe, whereas the most melanic *purpuralis* are produced in the coldest Alpine and Northern regions; the Italian races of *sarpedon* produce the extreme red form and race *dystrepta*, F. d. W., whereas that species produces the most melanic forms in France and Spain. All this is exactly as in *oxytropis* compared with *rhadamanthus*, for never has even a melanic aberration of the former been found, whereas the latter produces very dark individuals freely in the Maritime Alps and in Catalonia.

Subspecies *oxytropis* is proper to Italy, except for individual variations similar to it in the Maritime Alps and in Catalonia; it spreads from Piedmont to Sicily, but it has a tendency to localise. It usually flies in May; in the highest mountains it emerges in June. It varies very little as compared with *rhadamanthus*, both individually and geographically; however, a very distinct high mountain race exists and a few minor races are also discernible; they can be described as follows from large series collected by Querci, part of which I will preserve as "typical." The localities mentioned have been described in Querci's paper on *Z. loti* subsp. *transalpina*, Esp. (*Ent. Rec.*, page 28).

In all these races the *antennæ* are larger and thicker in the male sex, but vary markedly; the females in Florence often show faint traces of a white collar and epaulettes, which are extremely rare and never as marked in the other sex; the red scaling is more extensive, but a little paler in the former and the dark scaling inclines more to greenish. Variation in both sexes only affects the upperside of forewings, for the red patch resulting from the confluence of the red spots on the underside and the thin dark marginal band of the hindwings on both surfaces offer but very slight differences.

Boisduval in his *Essai d'une Monographie des Zygénides*, where *oxytropis* is first described and named, gives "Piedmont and Italy" as its habitat and adds that it has been collected in Rome (Querci has never found it in the neighbourhood of this city), and by Passerini in Florence. In his *Eur. Lep. Ind. Meth.*, published at the same time (1829), Boisduval only mentions "Tuscany." It is very likely his "types" were got from Passerini. In Florence there exists a race of *oxytropis* with the red spots more reduced in extent and consequently tending to separate from each other more than in any other locality Querci or I know of. In Boisduval's original figure they are reduced to an extent which is very seldom seen, but which anyhow only the Florence race approaches in its extreme form; that author figures and mentions particularly spot 3 (anterior median) as exceedingly small; spot 6 is confluent with spot 5, but it has very little extent too; the two basal spots are as short and as isolated from each other and from the median ones as they are ever met with in this species. I think on

the strength of these observations the Florentine race on the whole can be considered the "nymotypical" one; dealing with individual forms the name *conspicua*, Rocci, can be used, when necessary, to designate particularly the individual variation standing opposite to Boisduval's by its larger size, more extensive red spots and brighter look generally. The Florence race is one of the most vividly coloured, of a bright indigo (with no trace of green) and deep red in the male. In 64% of the specimens one finds the median spots are separated from each other, or only just touching at one corner, and in 20% also the apical spots are distinctly separate, which is quite a feature of the race. In only 1 or 2% of the males has the anterior basal spot been found to extend along the costal margin so far as to blend with the median one. No specimen of either sex has ever been found with all the spots united; in a few very rare females the median and apical spots are united by a streak. The Ligurian race of Genoa, described by Rocci, seems quite like the Florence one [*Atti. Soc. Lig. Sc. Nat. e Geogr.*, 1918].

Race **pumila**, mihi. At the highest altitude recorded for the species in Tuscany (Traversa, 2700 ft., on the Futa Pass road to Bologna) the smallest race known is met with; it looks still smaller than might seem from the figures mentioned below on the table of expanses, on account of its narrow wings and frail build; otherwise it is quite similar to the Florentine race and in no way approaches *sibyllina*, as might have been expected. I do not think the name *minima*, Rocci, given to dwarf aberrations of any locality should be used in this case.

Race **laterubra**, mihi. In the race of the Mainarde Mts. of Southern Italy (near Villalattina at Vallegrande, 1500 ft.), one finds some characters which distinctly remind one of *sibyllina*, and notably the red colouring, slightly paler than in Tuscany, and the dark scaling less bright and inclining more to blackish. The distinctive character of this race is, however, the tendency of the red scaling to expand so that the spots become confluent. In one specimen alone out of 115 are the apical spots separated from each other and even then not completely. The two basal and the two median spots blend respectively in 74% of cases. The confluence of spots 1 and 3 along the costal margin in 62% of the specimens is remarkable (form *unita*, Rocci); magnificent examples of form *confluens*, Zick., with all the spots united, are comparatively frequent. Size much more variable than at Florence.

Race **quercii**, mihi. This is the largest race of *oxytropis*. It has been collected by the Quercis on Mt. Cuccitiello, 2000 ft., near S. Martino delle Scale (Palermo). Size very constant, from 26 to 30 mm. It shows mountain characters still more markedly than *laterubra*, especially with reference to thin scaling. Its other distinctive characters are the decidedly green tinge of the indigo scaling in both sexes, so that this comparatively light colour makes a deep black marginal band vaguely discernible also on forewing. The red scaling is decidedly of a pink hue in the female and pale also in the male. Variation is small; apical spots always confluent; median ones not markedly so.

Race **sibyllina**, Vrty. [*Bull. Soc. Ent. Italiana*, xlvii., p. 77 (December, 1915)]. I have described from a series of Bolognola, 2700 ft., in the Sibillini Mts. (Marche), the most distinct race of *oxytropis* as yet known, being evidently its high-mountain variation.

It is not as small as on the arid and barren slopes along the Futa road in Tuscany, but its mountain characteristics consist in the very thin scaling, which makes it much more translucent and shows off a diffused black marginal band also on the forewing, and in the dull colouring, which is very different from the gaudy metallic one of the other races; the dark scaling is of a blackish indigo and the red one is pinkish; the extent of the latter is on the whole greater than in Florence and about the same as in Sicily. Rocci has found this race also on the highest Ligurian mountains.

The following tables, drawn out from measurements of the wing expanse made by Querci, shows the individual variations of each race:—

Expanse.	Florence.		Traversa.		Villatina.		S. Martino.		Bolognola.	
mm.	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
22 to 23			1		1					
23 to 24				2	4	3	1		1	
24 to 25	2		2	1	14	6			7	
25 to 26	8	4	1	1	16	13			18	1
26 to 27	22	10			12	18	2		20	2
27 to 28	5	6			9	11	9	7	17	2
28 to 29		1			2	6	5	2	2	1
29 to 30							1	3		

The races and many striking individual forms of the very variable subspecies *rhadamanthus* have been admirably described and partly figured by Charles Oberthür in his *Ét. Lép. Comp.*, vol. iv. (1910), where he summarises also what had been published before by himself and others. I can do no better than refer the reader to this work. I am sure M. Oberthür will pardon me if I take this occasion to mention my personal impression that he should have fixed by a name some of the races he has so well described, and if I take the liberty of suggesting the following for those of *rhadamanthus*:—

Race **pyrenæa**, mihi, for the race of La Traucada d'Ambouille in the Pyrenees (page 590), which corresponds to *sibyllina* of *oxytropis*.

Race **barcina**, mihi, for the race of Barcelona (Spain), (page 590), small, very bright, with body covered with white hair, in which specimens quite similar to *oxytropis* (I have seen a Spanish one too) occur together with form *kiesenwetteri*.

Race **oxytropiferens**, mihi, for the race of the Maritime Alpes Département (page 592), particularly beautiful and variable, ranging from individuals indistinguishable from *oxytropis* to the darkest *kiesenwetteri* and producing the lovely form with a white streak along the cubital nervure of forewing, which should be called **albovittata**, mihi.

Finally I think the name *grisea*, Obth., given to a form with indigo scaling replaced by very pale gray, which is the prevailing one at Digne, should be extended to the entire race (page 591).

Synoptic table of characters in the different races of *oxytropis*:—

Locality	.. Sibillini Mts.	Florence.	Futa Pass.	Mainarde Mts.	Palermo.
Name	.. <i>sibyllina</i> , Vty. nymotypical.		<i>pumila</i> , Vrty.	<i>laterubra</i> , Vty.	<i>quercii</i> , Vrty.
Usualexpanse	25-28 mm.	26-27 mm.	23-25 mm.	25-27 mm.	27-29 mm.
Density of scaling	Very thin.	Thick.	Moderately thick.	Moderately thick.	Thin.

Locality	Sibillini Mts.	Florence.	Futa Pass.	Mainarde Mts.	Palermo.
Light coloured ♂	dull red.	Bright red.	Red.	Red.	Light red.
scaling .. ♀	red.	Bright red rarely pinkish.	Red.	Pale red.	Pinkish.
Dark scaling-	♂ blackish indigo and dull.	Indigo.	Indigo.	Indigo.	Greenish indigo.
	♀ greenish indigo.	Greenish indigo.	Greenish indigo.	Greenish indigo.	Very pale indigo.
Extent of spots ..	Very limited.	Limited.	Limited.	Very extensive.	Limited.
Apical spots (5 and 6) ..	Confluent.	Often separate.	Confluent.	Confluent.	Confluent.
Confluence of spots 1 and 3 along costa	Never occurs.	Very rare.	Never occurs.	Frequent.	Never occurs.

Statistical table of variations of upperside of forewing in different races:—

Basal spots.	Median spots.	Apical spots.	Sibillini Mts.	Florence.	Mainarde Mts.	Palermo.
			♂ ♀	♂ ♀	♂ ♀	♂ ♀
Isolated ..	Separate.	6th obliterated.	1			
Isolated ..	Separate.	Separate.		9	1	
Isolated ..	Confluent.	Separate.		1		
Confluent along costa with median ..	Confluent.	Separate.		1		
Ditto ..	Separate.	Separate.	1			
Isolated ..	Separate.	Confluent.	54 5	13 15	12 17	13 10
Isolated ..	Confluent.	Confluent.	1	1 2	12	5
Confluent along costa with median ..	Separate.	Confluent.			10 10	
Ditto ..	Confluent.	Confluent.		2 3	18 17	2
Isolated ..	Confluent.	Confluent with median.		1		
Confluent along costa with median ..	Confluent.	Ditto.			3 12	
Confluent along costa with apical ..	Separate.	Diffused.			1	
Total of spec. examined			56 6	27 21	56 57	18 12

Ants from Mesopotamia and North-West Persia. (With plate V.)

By W. C. CRAWLEY, B.A., F.E.S.

The following paper contains a list of some thirty species, subspecies and varieties of *Formicidae* taken in Mesopotamia and North-west Persia by Mr. P. A. Buxton and Lieut. W. E. Evans, principally during the years 1918 and 1919. Though the number of forms is small, it contains two new species, one new race, and four new varieties, in addition to a new species and a new variety described by Mr. H. Donisthorpe in 1918. I have included in the paper the record of three South African species taken by Mr. Buxton.

It is interesting to note that among Lieut. Evans' Mesopotamian

ants is a single specimen of *Polyrhachis simplex*, Mayr, a species very common in India, and the only member of this large genus that is found so far west in Asia as Mesopotamia.

My thanks are due to Professor C. Emery for his help and for the loan of examples of several species not represented in my collection.

Sub-family I. PONERINÆ, Lep.

Anochetus ghiliani, Spin. ♂.

Sar-i-Pal, Persia, 1919 (Evans).

Sub-family II. DORYLINÆ, Leach.

Dorylus (Typhlopone) fulvus, Westw. ♂. Tigris, 1918 (Evans).

♀ Amara, 1918 (Buxton).

Sub-family III. MYRMICINÆ, Mayr.

Myrmica bergi, Ruzsky, var **fortior**, var. nov.

♀ L. 5.0 mm.

Head broader than in *bergi*, and sculpture of head and thorax coarser and more broken, and that of nodes much coarser than in the type. Entire body darker than in *bergi*: in all other respects similar to *bergi*. Enzeli, N.W. Persia, 1919. (Buxton).

Comparison made with an example of *bergi* from the author himself, kindly sent me for the purpose by Prof. Emery. This specimen came from Aral.

Aphaenogaster sp. N.E. of Baghdad, 1918. A single ♀ mounted on a card with specimens of *Monomorium gracillimum*, Sm., with which it was apparently taken.

Messor arenarius, F. ♀ Baghdad, 1918. (Evans).

Messor platyceras, sp. nov. Fig. 3 and 3a.

♂ Major. L. 7.5 mm.

Black; mandibles, apex of scape, the funiculus, joints of legs and the tarsi reddish-brown. Whole body covered with a yellowish pilosity, longest on pronotum, short on antennæ and legs.

Head as broad as long, narrower in front, occipital border feebly concave, eyes situated behind middle of sides. Scape do not quite reach occipital border. First joint of funiculus longer than 2nd, flattened so as to be twice as long as broad with parallel sides, and much wider than 2nd joint when viewed on its flat side, whereas viewed the other way it is thinner than 2nd joint. From the 2nd to the 6th the joints decrease slightly in length and increase in thickness. The whole antenna and the joints are shorter and thicker proportionately than in the var. *amphigea*, For. of *oertzeni*, For., which has a very similarly shaped first joint. A medium-sized tooth at base of scape. Clypeus flat, the anterior border slightly excised. Promesonotum much arched, shoulders evenly rounded. Base of epinotum nearly twice as long as declivity, their junction forming a sharp angle in profile, but without teeth. Petiole in profile with a rather thin scale, concave in front; postpetiole rounded and lower.

Mandibles entirely coarsely and evenly striate. Whole of head longitudinally striate; there are no curved striæ in the antennal socket; the striæ are broken on the occiput where there are a few long shallow punctures; head shining. Pronotum anteriorly transversely rugose, the rugæ curving round the sides; posteriorly, irregularly longitudinally rugose above; mesonotum irregularly transversely rugose; epinotum evenly transversely striate above; sides of mesonotum and epinotum transversely rugose. Petiole smooth anteriorly, transversely rugose above and behind; postpetiole longitudinally rugose anteriorly, transversely rugose posteriorly. Base of gaster longitudinally striate for a short distance, the rest smooth and shining.

♀ Media. L. 6.5 mm.

Dark reddish brown, gaster black, the rest as in ♀ major. Pilosity as in ♀ major. The scapes just reach the occipital border. Sculpture somewhat finer than in ♀ major, otherwise similar. N.W. Persia. (Evans, No. 50).

This species is characterised by the broad and flat 1st joint of the scape, the only other species, as far as I know, that has a similarly shaped joint being *oertzeni*, For., var. *amphigea*, For., but, apart from the colour, is readily distinguished from *amphigea* by the much shorter antennæ and the sculpture.

Messor platyceras, Crawley, var. **rubella** var. nov.

♀ Major. L. 8.8mm.

Differs from the preceding as follows:—Colour: reddish-brown; mandibles, cheeks and legs paler. Eyes in middle of sides of head; first joint of funiculus similarly formed, but 2nd rather shorter in proportion; pro-mesonotum less highly arched; pronotum smooth and shining in centre. The whole thorax and epinotum less coarsely sculptured; postpetiole irregularly transversely rugose and very matt; gaster entirely smooth and shining. Pilosity similar, but somewhat shorter on the pronotum.

♀ Minor. L. 5.0mm.

Entirely castaneous; gaster somewhat darker. Entire sculpture finer than in ♀ major.

♂. L. 7.6mm.

Black; legs dark brown, joints and tarsi lighter. First joint of funiculus not flattened, equal in length to the 2nd, and slightly thicker (shorter than 2nd in *arenarius*, *barbarus*, *structor*, etc.), and both 1st and 2nd longer than the following joints. Mandibles 7-8 dentate, striate; clypeus irregularly rugose, head irregularly longitudinally rugose. Scutum shining in front, feebly longitudinally rugose in centre and at sides. Scutellum irregularly rugose, shining in centre; epinotum matt, feebly transversely rugose; nodes rugose; gaster shining.

Body covered with a long golden pilosity, most abundant on mesonotum and apex of gaster.

N.W. Persia, at 4,000 feet. 1919 (Buxton).

Messor barbarus race *semirufus*, And. ♀. N.W. Persia, 1919 (Buxton); Baghdad, 1918 (Evans).

Messor barbarus race *semirufus*, E. André, var. **obscurior** var. nov.

♀ Major. L. 7.5-8.0 mm.

Differs from *semirufus* as follows:—Colour dark-brown, in some specimens almost black, the colour being uniform except for the mandibles, tibiae, tarsi and scapes, which are a dull dark reddish-brown. In other examples the promesonotum and underside of head are a dull dark red, considerably darker than in the darkest examples of the type species.

Sculpture of head, especially on occiput, somewhat coarser than in the type, and on the pronotum, instead of being feebly and irregularly striate transversely, is evenly and regularly striate transversely on neck, and on the rest, coarsely irregularly striate transversely, and the striae in the centre often run longitudinally. Sculpture of rest of thorax and nodes similar to, but coarser than in *semirufus*. Pilosity similar but darker.

♀ Minor. L. 3.5 mm.

Has the same corresponding differences as the ♀ major. Amara, 1918 (Buxton); Baghdad 1918 (Evans).

M. barbarus race *semirufus*, And., var. *ebenina*, For., N.E. of Baghdad, 1918. A single ♀ on a card with *M. barbarus* race *semirufus* var. *obscurior*.

As far as can be judged from a single ♀ minor, this specimen belongs to Forel's var. *ebenina*.

Pheidole pallidula, Nyl., subsp. *arenarum*, Ruzsky, var. *orientalis*, Em. 2 ♀. N.W. Persia, 1919 (Buxton); Baghdad, 1918 (Evans).

Donisthorpe (*Ent. Rec.*, xxx., 10, p. 165, 1918) has recorded this form from Mesopotamia as *pallidula* i.sp. Emery, however, (*Rev. Zool. Afr.*, iv., 2, p. 229, 1915), states that *pallidula* i.sp. is not found in Asia, where the form that occurs is a variety, which he there calls *orientalis*.

Crematogaster scutellaris, Oliv., subsp. *schmidtii*, Mayr. ♂. Caspian, N.W. Persia, 1919 (Buxton). This subspecies is stated by Emery to differ, apart from its colour, from *scutellaris* i.sp. by its habit of nesting on the ground, and visiting herbaceous plants instead of trees. Taken attending *Aphis punicae*, Pass., on wild pomegranate.

O. scutellaris, Oliv. ? var. ♂. N.E. of Baghdad, 1918 (Evans).

I cannot detect any difference in these specimens from the typical *scutellaris*, though the ants were found under clods of earth (whether or not in a nest is not clear), whereas according to Emery true *scutellaris* nests and lives on trees.

Cardiocondyla nuda, Mayr., subsp. *mauritanica*, For. Tigris, 1918. On a card with *Plagiolepis pygmaea* and *Prenolepis* sp.

Tetramorium caespitum, L. ♂. Enzeli, Caspian, March and June, 1919 (Buxton).

Monomorium gracillimum, Sm. ♂. Baghdad, 1917 (Buxton); 1918 (Evans).

M. salomonis, L. ♂. Baghdad, 1918 (Evans).

M. buxtoni, sp. nov. Fig. I.

♂. L. 2.5-2.6 mm.

Dirty yellowish-brown; gaster darker. Pilosity as in *abeillei*, Ern. André.

Head longer than wide, sides feebly convex, no broader in front than behind, occipital border slightly concave. Mandibles 4-dentate. Clypeus as in *abeillei*. Eyes in middle of sides of head. Scapes just reach occiput. Thorax incision as in *abeillei*, very slight; base of epinotum almost straight, but not quite so straight as in *abeillei*, forming a more rounded angle with the declivity; upper surface of epinotum feebly impressed (strongly so in *abeillei*). Petiole higher than in *abeillei*, and not so broad proportionately at base.

Head, thorax and pedicel entirely opaque (head, pronotum and pedicel shining in *abeillei*); head entirely matt, the sculpture being densely and deeply reticulate; and scattered punctures very few. Gaster feebly shining, the first segment superficially reticulate.

Though coming near to *Mon. abeillei*, Ern. And., the new species, besides differing as indicated above, is readily distinguished by its colour, André's species being reddish-brown, with gaster nearly black, and by its matt opaque appearance. The head again is not quite so broad proportionately in *buxtoni*, and is no broader in front, whereas in *abeillei* the head is wider in front, finely superficially reticulate with scattered punctures, besides being shining. The comparison was made with an example of *M. abeillei* kindly lent me by Prof. Emery.

Kumait, Mesopotamia, 1918. (Buxton).

M. (Holcomyrmea) dentigerum, Rog. ♂, ♀ Baghdad, 1918 (Evans).

M. (H.) evansi, Donisthorpe (*Ent. Rec.*, xxx. 10, p. 165, 1918) ♂, ♀, ♂. Tigris and Amara, 1918 (Buxton); Amara, 1918 (Evans).

Many of the ♂♂ and ♀♀ were taken *in cop*.

All of the numerous ♂♀ I have received from both Mr. Buxton and Lieut. Evans, as well as those received by Mr. Donisthorpe, are of uniform size. The ♂♀ of the sub-genus *Holcomyrmea*, as defined by Emery (*Bull. Soc. Ent. Fr.*, p. 189, 1915), are "very dimorphic." It is extremely unlikely that no ♂ major should have been captured among the large series that has been examined, if a ♂ major actually existed; therefore it appears likely that this new member of the sub-genus is an exception to the general rule.

♂. The head is slightly broader than long (without the mandibles), widest at eyes, slightly broader in front than behind, sides feebly convex. Occipital border slightly concave; in centre of occiput is a distinct impressed longitudinal line; a feeble impression also on vertex. The scapes do not reach the occipital border by a little more than their width. Anterior border of clypeus strongly concave between the teeth.

A few striæ on cheeks; the semi-circular striation in antennal socket very feeble.

Thorax strongly constricted at meso-epinotal suture; the latter in profile deeply impressed. Arch of epinotum regularly curved, showing hardly any division between base and declivity. Stalk of petiole shorter than the width of the node at its base. Second node seen from above wider than first, and produced at each side into a sharp angle.

Antennæ and legs with erect hairs.

Sub-family IV. DOLICHODERINÆ, Forel.

Tapinoma erraticum, Ltr., subsp. *nigerrimum*, Nyl. ♂. S.W. Caspian, 1919; Amara, 1918 (Buxton). N.E. of Baghdad, 1918 (Evans).

The S.W. Caspian specimens were taken by Mr. Buxton attending *Aphis punicea*, Pass., on wild pomegranate.

(To be concluded.)

NOTES ON COLLECTING, Etc.

NOTES FROM THE HILL MUSEUM.—Mr. J. J. Joicey has recently acquired the important collection of Lepidoptera formed by Mr. H. J. Elwes, F.R.S., and the large collection of *Heliconius* formed by the late H. Riffarth.

The Elwes collection contains most of the types of species of the Indo-Australian fauna described by Elwes, as also some types of Doherty, de Nicéville, Christoph, and Staudinger. There is also included the material which formed the basis of the famous monograph on the Oriental *Hesperidae* by Elwes and Edwards, and also the material for the papers by Elwes on the genera *Ypthima* and *Æneis*, and on the butterflies of Chili. This collection is especially rich in *Lycaenidae*, and students of this group will find at the Hill Museum one of the largest collections.

The Riffarth collection of *Heliconius*, upon which was based the monograph by Riffarth and Stichel, contains over 2000 specimens, and includes 360 types and paratypes of species described by Riffarth and Stichel.

The collection of *Heliconius* now at the Hill Museum, is perhaps unrivalled.

The Museum has in progress papers on the Lepidoptera of Hainan, of the Schouten Islands, of Dutch New Guinea, Misol, Aru, Key, Obi, and Sula Islands, and of Central Ceram.

Mr. T. A. Barnes, F.Z.S., has recently returned from an expedition of twelve months' duration through little-known parts of Central Africa, undertaken on behalf of Mr. Joicey. A very fine collection of Lepidoptera was obtained, and Mr. Barnes has recorded many valuable biological observations. A report on this collection is in progress.

Mr. Barnes was accompanied by his wife on the trip of over 3000 miles. Cinematograph films were taken en route, and some of important scientific interest.

Consignments of Lepidoptera are shortly expected from Dutch New Guinea, where Mr. Joicey's collectors, the three brothers Pratt, are at work in the mountainous interior of an area entomologically unexplored.

It is proposed to publish a catalogue of all types of Lepidoptera existing in the Hill Museum, as these are now very numerous, and concern many different authors.

Students desirous of comparing specimens and types are invited to write to The Curator, The Hill Museum, Witley, Surrey.

ARGYNNIS CYDIPPE (ADIPPE) ON REIGATE HILL.—I took a fine male specimen of *A. cydippe* last week on Reigate Hill. I hear that this species has not been seen at Reigate for many years.—HENRY SPEYER, Highbury, Reigate, July 21st, 1920.

APATURA IRIS IN FEBRUARY.—Some time ago when in Paris I was informed that a specimen of *A. iris* was caught in February last by a Mr. Bishop some few miles from Paris, surely a most unusual occurrence at that time of year.—GEO. TALBOT, The Hill Museum, Witley, Surrey.

EPURAEA BICKHARDI, DEV., A BRITISH INSECT.—According to Mons. P. de Peyerimhoff, the *Epuraea* mentioned by me (antea, p. 153) is *E. bickhardi*, Dev. I hope to write a note on the insect shortly.—HORACE DONISTHORPE.

ZYGAENA TRIFOLII.—On June 6th, 1920, when breaking fresh ground in a favourite collecting wood that I visit, I discovered two adjacent meadows at the edge of the wood that have been allowed to become rough, and as there were plenty of flowers in bloom I walked them over, putting up a number of *Z. trifolii*—my luck was in for I had struck a colony much given to aberration, quite 66 % being abnormal—from ab. *orobi* to ab. *minoides*, as illustrated in South's *Moths of the British Isles*; the latter form was the rarest, but I secured a few quite good. On June 9th I saw the first *Z. filipendulae* in the same spot; from that day onwards both were flying together, but although I searched carefully, I failed to find any cross pairings.

Since that time until August 22nd *Z. filipendulae* has been flying there freely, but none that I have netted of this species show any signs

of aberration, nor do any show any results of a cross pairing that I can trace.

Is *Z. trifolii* much more given to aberrations than *Z. filipendulae*? It strikes me as strange that in a secluded spot where one insect varies so much—another (also given to variation) breeds so strictly on normal lines.—HAROLD E. WINNER, Cranleigh, Surrey, August, 1920.

CURRENT NOTES AND SHORT NOTICES.

The *Can. Ent.* for March contains "A Soldier's Collecting Day in France," (Col.); "A remarkable case of Homing Instinct" (Hym.), giving minute observations of the behaviour for more than half an hour of an *Ammophila* and its prey, a Lepidopterous larva; Notes by J. McDunnough, on "*Phyciodes batesii* and *P. tharos*," with a plate; descriptions of New Species of Hymenoptera, Diptera, Coleoptera, and Coccidae, etc.

In the *Ent. News* for March several new species of *Bucculatrix*, from the U.S.A., are described with other species of Tineina, and the article on specific names, etc., is concluded.

The *Ent. Mo. Mag.* for March contained descriptions of the following new species: *Aprophora maculata* on *Salix*, from the New Forest, *Oncopsis carpinicola* on hornbeams, at Colesbourne, *Macropis scotti* (common), *Anoscopus kirschbaumi*, Ewhurst, Pevensy, etc., and *Limotettix persimilis* from Tintagel, on grass, all Cicadina new to science, by James Edwards; and *Loderus gilvipes*, a sawfly new to Britain, by the Rev. F. D. Morice, from Lancashire.

The *Bulletin Soc. ent. de Belg.* contains a continuation of the Notes on the early stages of the Trichoptera, including an interesting account of the water-snares of the *Hydropsyche* species, with several figures and observations of the habits of the larvæ, by M. J. A. Lestage. M. Lestage also gives a table of the Belgian species of the genus *Perla*. M. Ball records the capture of the *havercampi* form of *Brenthis aphirape*, at Horkay, Belgium. M. Lemeere notes the extreme abundance of *Melolontha hippocastani* (Col.), and the occurrence of numerous examples of the black aberration of the female, at Genck, Belgium. M. Lestage gives a list of the Coccinellid aberrations, met with by himself and M. Guillaume on the dunes at Blankenberghe, where several species, including *Adalia 10-punctata (variabilis)*, particularly the last, were in extreme abundance. The list contains 39 aberrations of this species, of which seven have not hitherto been recorded. In another contribution M. Lestage records new observations on the oviposition of *Cloëon dipterum* (Ephem.), and concludes that the laying only takes place when the female is in actual contact with the water. The eggs are agglomerated in a ball at exclusion, but immediately on contact with humidity separate, and the larvæ emerge.

The *Ann. Soc. ent. Belgique* contains a series of notes on the species of *Bombus* (Hym.) found in Belgium, listing the various known forms of each species, and referring in detail to the less known. As most of the species found in Belgium are also to be obtained in Britain these notes will no doubt be useful in this country. They are written by M. Ball.

The *Scottish Naturalist* contains in recent numbers Notes on the Diptera of the Forth Area by A. E. J. Carter, Notes on the Insect

Fauna of S. Uist by Percy H. Grimshaw, recording the larvæ of *Nyssia zonaria* in thousands, abundance of pupæ of *Abraaxas grossulariata* lying in the crevices of rocks, the larvæ having fed on heather, and the prominent banded form of *Camptogramma bilineata*; and the description by F. W. Edwards of a species of Mosquito new to Britain, from various localities in Scotland, to which the name *Theobaldia arctica* has been applied provisionally until more be known of its northern congeners. Among the smaller items one finds recorded the occurrence of *Cetonia aurata* in Argyllshire, of the melanic form of *Aphodius scybalarius* (not mentioned in Fowler's *Col. Brit. Is.*), a second Scotch example of *Balaninus villosus*, etc.

The recent numbers of the *Bull. Soc. ent. France* contain the description of a new aberration of *Melitæa parthenie* under the name ab. *faivrei*, by M. Le Charles, in which the antennæ and fringes of forewing are entirely black, the forewings above typical, the hindwings with less emphasis of markings but more suffusion basally, while the striking character is the broad blackish transverse band across the disc of the hindwing below, from costa to inner margin, replacing the yellowish white band of the type, obtained from Fontainebleau in May, 1916; a critical account of a collection of Microlepidoptera from St. Saens (Seine-Inferieure), and describing two new species, (1) *Cnephasia crassifasciana* (Tort.), near *C. sinuana*, (2) *Scythris hypotricha* (Tin.), near *S. inspercella*, by M. l'Abbé J. de Joannis; by the last named author a series of remarks upon the constitution of the genus *Scythris* as understood by various authors, both in its *sens. lat.* and its *sens. strict*; an account of some insects destructive to vines in 1919, by M. Picard, includes *Tanymecus palliatus* (Col.), attacking the buds in the high Val de l'Hérault, a species usually met with but little away from the coast, the larvæ of *Calocampa exoleta*, near Beziers, in a humid area, the larvæ of *Deilephila lineata* var. *livornica*, in considerable numbers near St. Tropez, where much loss was sustained, and other pests.

We would ask those of our readers who have the very useful *Compendium of Named Varieties of Abraaxas grossulariata*, by the Rev. G. H. Raynor, to read the critical remarks made in the *Naturalist* by Mr. G. T. Porritt.

In the *Rev. Mens. Namur*, M. H. de B. Walcourt names a female example of *Pieris brassicae* in which there is a black point between nervure 3 and 4 on the hindwings upperside as ab. *nigropunctata*, so that it may be in accord with the similar aberration in *P. rapae* and in *P. napi*, and he applies this name to the spring form *lepidii* (*rapae*) as well as to the summer form. Subsequently, however, he points out that the name *posteromaculata* had been applied to the similar aberration in *P. napi* in both generations, and that thus his name *nigropunctata* would not apply to the last-named species. It will be remembered that the male of *P. brassicae* has a similar aberration of the forewing, which is known as ab. *nigronotata*.

In the same periodical recently the following new names have been bestowed on aberrations by M. l'Abbé Cabeau, (1) Of *Papilio machaon* ab. *benevittatus*, in which the apical marginal yellow spot of the hindwing is absent, resulting in the black and blue band becoming of practically uniform width throughout. (2) Of *Agriades coridon* ab. *tarasina*, in which on the underside of the forewings the ocelli, except in the submarginal area, run together, forming a single spot, showing

very strikingly on the light ground. (3) Of *Nisoniades tages* ab. *poliodes*, which is difficult to recognise as this species, except that an anteapical subcostal white point is seen clearly on the forewings, it is scarcely possible to distinguish the small marginal spots, the black marginal border on the discal markings, the whole surface of the forewings is of a pale brown, and of the hindwings almost entirely whitish with white fringe, the whole underside is of a pale yellow with the normal markings scarcely apparent. (4) Of *Brenthis euphrosyne* ab. *chlorographa*, in which the internal space between nervures 1 and 2, in the median region on the forewing's upper surface, contains a well developed whitish-yellow cloud, and is homologous with ab. *chlorographa* of *B. selene* (*Rev. Mens.*, 1912, with fig.); and (5) Of *Coenonympha arcania* ab. *exocellata*, in which the forewings have no subapical spot below.

In the Doings of Societies Section of the *Ent. News*, we read that Dr. Skinner exhibited at the Entomological Society of Philadelphia a wonderful gynandromorph of *Papilio turnus*, having the right wings of a yellow male and the left of a black female form, captured in July, 1919, at Merion, Pa. In the same magazine E. G. Smyth gives an account of the insects which are pests of cotton in Porto Rico; so far the presence of the dreaded pink boll worm, *Pectinophora gossypiella*, has not yet been found, yet the list of enemies is formidable enough. Werner Marchand writes on "Thermotropism in Insects," giving the results of his observations and experiments. Among the characteristic cases of this phenomenon are included those of the cockroach, and particularly mosquitoes, which are attracted by the heat of the human skin.

In the *Ent. Mo. Mag.* Mr. J. H. Keys describes a new sub-genus of the *Staphylinidae* (Col.), named *Plagiarthrina*, and in it places a species new to science, which he describes and names *P. fordhamiana* from specimens sent to him by Dr. Fordham, who found them in flood-refuse, at Selby, Yorkshire, in January, 1919. It resembles the genus *Metarypa*.

The *Canadian Entomologist*, in its "Popular and Practical Entomology," contains an interesting account of a day's collecting Longicorn beetles in the woods near Peterborough, Ontario, a full account of the "Imported Currant Worm," *Pteronus ribesii*, and some fragments of the Life-histories of a few Manitoba Insects. There is an obituary of the late Dr. Gordon Hewett, who, to our surprise (knowing of him by repute alone), was only 35 years of age at his decease. It was as recently as 1909 that he left England for the Dominion, and yet in that short period of eleven years he had initiated and carried out such excellent economic work, that the Council of the Entomological Society of Ontario said of him that they "desire to place on record their high appreciation of his eminence in this branch of Science, and of the notable work that he carried on by establishing field laboratories, which he directed at the central office in Ottawa." He had already passed the chair of the Society. Dr. McDunnough writes some notes on the larvæ and pupæ of several Pterophorids and gives a plate of figures (enlarged) of the pupæ of four species. There are several papers on Myriapoda, which order seems to be attracting some amount of attention lately from the readers of the magazine.

Under a "Plea for Definitiveness," a correspondent of the *Ent. News* points out that many contributions, dealing with a species,

genus, or restricted section, give no indication as to the systemic position of the object or objects described, and that thus the younger student, the more specialised student and the ordinary readers, who may be many in number, cannot be familiar with all orders, yet wish to know something to bring them in touch with the writers of such articles. At present such workers are often absolutely "at sea" as to the family, etc., under discussion. The aim of every describer should be to "place his findings in such a position that they will be readily available to others." The long list of synonyms in our Catalogues in all orders should stand as a warning to these slipshod authors; in fact one would almost wish for a drastic rule. "A specialist should bear in mind that everyone is not up-to-date in his particular field, but a great deal more interest would be taken if greater definition were given."

We would like to call the attention of Fellows of the Entomological Society to the recently passed rule, Chap. xiv., Clause 3, "Except in the case of those who have already compounded, every Fellow elected before January 1st, 1921, shall pay the Annual Contribution of Two Guineas unless he does not desire to receive the Transactions of the Society, in which case his Annual Contribution shall be one Guinea per annum."

SOCIETIES.

THE ENTOMOLOGICAL SOCIETY OF LONDON.

March 17th, 1920.—ELECTION OF FELLOWS.—Messrs. Christopher Arthington Cheetham, Wheatfield, Old Farnley, Leeds; G. S. Cotterell, Newlyn, Gerrard's Cross; Harry Leon Gauntlett, F.Z.S., M.R.C.S., L.R.C.P., A.K.C., 45, Hotham Road, Putney, S.W.15; Thomas Frederic Marriner, 2, Brunswick Street, Carlisle; C. Smee, 6, Wildwood Road, Golders Green, N.W.4; and Dr. B. Uvaroff, the Georgian Museum, Tiflis, Transcaucasia, were elected Fellows of the Society.

PROPOSED ALTERATION OF BYE-LAWS.—The proposed alterations in the bye-laws were read for the second time.

VARIETIES OF BRITISH LEPIDOPTERA.—Prof. Poulton exhibited, on behalf of Mr. F. C. Woodforde, the following varieties from the collection of British insects in the Hope Department at Oxford.

1. *Chrysophanus phlaeas*, L., ab. *schmidtii*, Gerh., Burnt Woods, Market Drayton, N. Staffs.: September 8th, 1917. F. C. Woodforde.

2. A variety of the same species with the coppery area of the forewing replaced by a smoky ochreous. The same locality: August 5th, 1918. H. F. Onions.

3. The var. *eleus*, F., of the same species, Milford, Surrey: July 29th, 1908. From the collection of the late Lt. R. J. Champion.

4. *Celastrina argiolus*, L., var. with radiate spots on the hindwing underside, the forewing spotless. Near Ashurst Lodge, New Forest: May 8th, 1915. F. C. W.

5. *Catocala nupta*, L., var. with the red of the hindwings replaced by a dark maroon colour. Taken at light, Guildford: September 2nd, 1917. From Coll. R. J. Champion.

THE STRATIOMYID FLY *BERIS VALLATA* CAPTURED WITH ITS TENTHREDINID MODELS.—Prof. Poulton exhibited a series of six examples of

Beis vallata, Forst., captured with the following *Tenthredinidae*—2 ♀ *Dolerus aericeps*, Th.; 1 ♂ *Selandria serva*, F.; 4 ♂ *Athalia lineolata*, Lep., by Mr. A. H. Hamm, on July 13th, 1907. All thirteen insects were taken from flowers, chiefly *Umbelliferae*, growing over a small area of Hogley Bog, Cowley, near Oxford. The first-named sawfly was far less perfect as a model than the other two, the last-named being the most perfect.

ENTOMOLOGICAL-METEOROLOGICAL RECORDS.—Major H. C. Gunton exhibited a diagram referring to Macrolepidoptera of the 1919 season in order to suggest a graphical method of recording observations of the appearance and habits of insects in relation to weather conditions.

On a sheet of squared tracing cloth (each square having sides one-tenth of an inch) the names of the species of insects are tabulated vertically on the left-hand side in the order in which they appeared on the wing, while along the top and bottom the dates are written, so that there is one horizontal row of squares for each species and one vertical row for each date. By means of different symbols representing fallow, sugar, ivy, light, "settled" and "in flight," the circumstances in which each observation is made are recorded in the appropriate square.

The lower portion of the same sheet is devoted to particulars of the weather for each day, plotted to convenient scales and including rainfall, humidity, barometer, maximum and minimum temperature, direction and strength of wind, and general character of weather, using the same conventions as those employed by the Meteorological Office. The quarters of the moon are also indicated.

BIRDS AND BUTTERFLIES.—Dr. G. D. H. Carpenter said that since many naturalists believe that birds do not eat butterflies, no case of such an occurrence should be left unrecorded; on February 15th of this year about mid-day he saw a male Brimstone butterfly fly through the garden at Oxford, and three sparrows that were on the ground leapt into the air and, fluttering clumsily, attempted to catch it; the butterfly easily evaded the birds.

LIFE-HISTORIES OF SOME COLEOPTERA.—Mr. H. Main exhibited lantern slides illustrating the life-history of the beetles *Copris lunaris*, *Onthophagus vacca*, and *Necrophorus humator*.

PAPERS.—The following papers were read:—"A contribution to our knowledge of the Life-history of the Stick Insect, *Carausius morosus*, Br.," by George Talbot, F.E.S.; "A Record of Insect Migration in Tropical America," by C. B. Williams, M.A., F.E.S.; "The Geographical Factor in Mimicry," by F. A. Dixey, M.A., M.D., F.R.S., etc.

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.

March 25th, 1920.—LOCAL RACES OF *B. PARTHENIAS*.—Mr. A. A. W. Buckstone exhibited series of *Brephos parthenias* from Wimbledon, Oxshott, W. Wickham, and Darenth, and pointed out local characteristics; also ova of *Apocheima hispidaria*.

NEW FORM OF *C. TRUNCATA*.—Mr. B. S. Williams, a striking new form of *Cidaria (Dysstroma) truncata* from Finchley, the basal third black margined by a conspicuous white line.

THE SPECIES OF *UTETHEISA*.—Mr. Hy. J. Turner, three species of

Utetheisa, *U. pulchella*, several localities: ab. *candida*, Natal; ab. *lotrix*, Assam and New Zealand; ab. *thyter* (?), Cyprus. *U. ornatric*, warmer parts of America, and *U. bella*, sub-sp. *venusta*, Jamaica.

GALLS IN ASPEN.—Mr. Blair, galls of larvæ of *Saperda populnea* (Col.) in stems and twigs of aspen.

EARLY CAPTURES.—Mr. Barnett, reported for March 21st at Oxshott, *B. parthenias* (abundant), *X. areola*, *T. crepuscularia*, *T. punctularia*, *T. carpinata*, and *G. rhamni*, and at Ashted, *E. polychloros*.

THE SEASON.—Reports showed general scarcity of spring larvæ; larvæ very small, larvæ of *A. caia* in fair numbers, *B. parthenias* in swarms, *H. leucophaearia* scarce, *E. cardamines* out, and *E. polychloros* in various places.

April 8th.—NEW MEMBERS.—Mr. S. Gordon-Smith, of Boughton, Cheshire, was elected a member.

WANSTEAD FLATS.—A resolution was passed strongly condemning the proposal to enclose portions of Wanstead Flats and of Epping Forest for permanent allotments.

EXHIBITION AND DISCUSSION OF *D. TRUNCATA*.—There was a special exhibition and discussion of *Dysstroma* (*Cidaria*) *truncata*; Messrs. Bowman, Turner, Newman, Mera, Tonge, Williams, and others took part. Mr. Bowman dealt particularly with the race (new) with which he and Mr. Williams had met; Mr. Turner summed up the variation of the species and its differentiation from *D. citrata* (*immanata*).

GYNANDROMORPH OF *H. MARGINARIA*.—Mr. Newman, a specimen of the curious gynandromorph of *Hybernia marginaria* taken at Chaily, Sussex, and reported an oak at Bexley as partly in leaf on March 31st.

ABERRATIONS OF *A. URTICÆ*, ETC.—Mr. Harding, the aberrations of *Aglais urticae* bred or captured by him during the last forty years, with a chrome-yellow banded *P. atalanta* and a chrome-yellow *H. jacobaeae*.

A XANTHIC *E. TITHONUS*.—Mr. Tatchell, a fine xanthic *Epinephele tithonus* from Dorset, and a living larva in situ of *Trochilium crabroniformis* in a willow stem.

PSYCHID CASES AND *D. TORTRIX* (COL.).—Mr. Bunnett, imagines and larval cases of the Psychid *Taleporia tubulosa* from Farnborough, and the beetle *Dorytomus tortrix* bred from poplar catkins.

PLUSIA LARVÆ.—Dr. Robertson, larvæ of *Plusia iota*.

April 22nd.—TENARIS AND OPSIPHANES.—Mr. S. Edwards exhibited *Tenaris honrathi* from Java and *T. selene* from N. Guinea, *Dynastor napoleon* from S. America, and several species of *Opsiphanes*.

VARIETIES OF BRITISH HETEROCERA.—Mr. Newman, the pale Cheltenham form of *Gonodontis bidentata*, unusually large *Tephrosia luridata*, curiously radiated forms of *T. bistortata*, and varied series of *Hydriomena impluviata*, *H. furcata*, etc.

RARE BOOK.—Mr. Hy. J. Turner, a copy of Mouffet's "Insectorum sive Minimorum Animalium, Theatrum," 1634, and numerous species of the genus *Plusia*.

VARIATION IN *R. PHLÆAS* IN 1911.—Mr. B. S. Williams, *Rumicia phlaeas*, heavily spotted, dusky, with pear-shaped spots, ab. *kochi*, with dark nervures, with wide borders, etc., all from Finchley, in 1911 chiefly, a hot season.

N. FRENCH LEPIDOPTERA.—Capt. Crocker, a collection of Lepidoptera representative of what he had met with in the battlefields of N.W. France, chiefly in 1919, including *Issoria lathonia*, *Melitaea cinxia* from a very wet marsh, *Nordmannia ilicis*, *Colias hyale*, etc. Among the moths were *Aglia tau*, *Lymantria dispar*, *Notodonta tritophus*, *Sciopteron tabaniformis*, bred from poplar stumps, *Senta maritima* in great variety, etc.

THE SEASON.—Various notes on the season were communicated.

May 13th, 1920.—EXHIBITION OF ORDERS OTHER THAN LEPIDOPTERA.—Mr. Stanley Edwards exhibited a collection of Exotic Coleoptera and Orthoptera.

Mr. S. R. Ashby, British ground beetles, Lamellicorns, Buprestids, Elaterids and many Weevils from his collection.

Mr. Barnett, part of a gate-post excavated by a leaf-cutter bee, one cavity containing fifteen cells; an exceptionally brilliantly marked young viper; and the body of a large lizard taken from the stomach of another viper.

Mr. Cocks, Coleoptera characteristic of the Wellington College area including the fire-beetle *Melanophila acuminata* which was quite abundant there.

Mr. Step, for Mr. Carr, the local Crucifer *Dentaria bulbifera* from near Chalfont.

Mr. H. Moore, many species of Orthoptera collected by Mr. Grosvenor near Bangalore, India, and read notes on the exhibit.

Mr. West, four drawers of his collection of British Hemiptera.

Mr. Step, the weevil, *Balinus nucum*, from Wimbledon.

Mr. H. W. Andrews, many species of British Diptera showing wing-pattern and coloration, and read notes on the exhibit.

Mr. Coppeard, the Palmated Newt (*Molge palmata*) and its ova.

Mr. Priske, the shells of *Helix virgata*, including white aberrations from Tenby, and the red form of the slug *Arion ater*.

Mr. Withycomb, a cultivated plant of the Butterwort, *Pinguicula grandiflora* and described its capture of insects.

Mr. Main, examples of various species of Mosquito and a series of preserved larvæ of the same, with a cage which he had made for breeding mosquitoes.

Mr. T. H. Grosvenor, the eggs of various species of Indian Birds from the N. Punjab, including six clutches of the Common Kite showing great variation.

Mr. Dennis, on behalf of Mr. R. S. Bagnall, species of Protura and Symphyla shown under the microscope.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

April 19th, 1920.—NEW MEMBER.—Prof. Leonard Doncaster, D.Sc., F.R.S., was elected a member.

VISIT TO THE SCHOOL OF TROPICAL MEDICINE.—Robert Newstead, Esq., M.Sc., F.R.S., Professor of Entomology in the Liverpool University, welcomed the members to the School of Tropical Medicine and gave a short account of its history and objects; the new buildings have only recently been entered, during the war they were used as a military hospital. Full suites of rooms and laboratories are arranged for the requirements of each subject:—Tropical Medicine, Entomology

and Parasitology, with a staff of professors and assistants highly qualified for the special work of the school. The building includes a museum and lecture theatre. The efficiency and completeness of the school was rendered possible by the foresight and liberality of the late Sir A. L. Jones, who fully recognised its value to the empire.

Professor Newstead and his assistants then shewed the members of the Society over the building and made the following special exhibits:—

Mosquitoes (*a*) *Stegomyia fasciata*, a Culicine mosquito responsible for the transmission of yellow fever. Examples of the fly were shown and a case illustrating phases in the life-history of the species. (*b*) *Anopheles maculipennis* and other Anopheline mosquitoes concerned in the spread of malaria. (*c*) Living larvæ of the rot-hole breeding mosquitoes, *Anopheles plumbeus* and *Ochlerotatus geniculatus*, which had been taken from the water in rot-holes in trees at Aigburth and other districts near Liverpool.

Tsetse flies:—A large collection, containing all the known species of *Glossina*, was on view. The most important species are *Glossina palpalis* chiefly responsible for the transmission of sleeping sickness, and *Glossina morsitans* which spreads trypanosomiasis among horses and cattle.

Acarids affecting flour.—Specimens of the Acarid *Aleurobius farinosae* and samples of flour in various stages of deterioration owing to infestation with this mite.

Plague fleas.—Specimens of the Indian plague flea, *Xenopsylla cheopis*, and the common rat flea of temperate countries, *Ceratophyllus fasciatus*, were shown.

Tabanidae.—A collection of blood-sucking flies of the family *Tabanidae*, chiefly African species was on view.

OBITUARY.

William West (of Greenwich).

By the death of William West there passes away one who was known to a past generation of entomologists as well as to many of those of the present time. When Newman and Stainton were the mentors of entomological work W. West was actively collecting; we hear of him as a regular attendant of the former's "at homes" on Friday evenings in the sixties, and he was a frequenter of Stainton's famous Burnt Ash Lane, now no longer a "locality" for entomologists. He was one of the small circle of friends at these meetings whose efforts founded, in 1872, that well known and popular Society, the "South London," with Messrs. J. Platt-Barrett, Bowden, C. G. Champion, and a few others. Unlike many who have passed through the membership of this Society, he continued from first to last to take the same enthusiastic interest with which he helped to found it so many years ago, for only some six or seven years ago he put forward the proposal to hold a second Annual Exhibition to be devoted to "other orders" exclusive of Lepidoptera, a scheme which his energy made a successful innovation. As the "South London" grew it became necessary to have a reference collection, and who could be a better keeper than the plodding, steady, field-worker W. West. He became the Hon. Curator of the Society, and the Honorary and honoured Curator of the Society he remained until the day of his

death. A Lepidopterist at first, he seems always to have had a liking for the smaller forms of life, and after making a good collection of the larger British Lepidoptera, he passed on to work the Micros, which in turn he came to know equally well, successfully working out the habitats of many then rare species. Finally he settled down to collect the British Coleoptera and Hemiptera, in both of which orders he amassed a very complete collection, including many rare species, and several which when he found them were new to Britain. He had a wide correspondence and did a considerable amount of exchange; he was ever free and generous in the disposal of his well-set duplicates. In fact a very large proportion of the nucleus of the reference collections was composed of specimens placed in the cabinets by himself. With an extensive knowledge of British insects and of practical field-work, he made one of the most useful members a Society could wish to have, and but few of those who have passed through the membership have not at some time or other had specimens, information, or other help from our old friend. Enjoying general good health he was rarely absent from the bimonthly meetings except when taking his annual holiday; he was present, and apparently quite well, when we spoke to him on July 22nd, the last meeting before his sudden death on July 30th.

W. West was born in Rotherhithe, in 1836, and early in life went to live in Greenwich, within easy reach of Greenwich Park, Blackheath, then a wild waste, Lea, Lewisham, and other now house-covered areas, but then haunts of many local insects. He was apprenticed in the firm of John Penn and Son, marine engineers, and for nearly 50 years worked in the brass foundry of that company, latterly as foreman of the shop. He retired in 1899, spending the latter years of his life largely in his favourite pursuits. It has been his custom to go down to the New Forest for several weeks each year, and more recently he has also spent a few holidays near Yarmouth with one of his daughters, always on the look out for some rare or new speciality.

He contributed but little to our magazines, most of his information was readily given to his fellow members of the S. London Society and to his friends in general. When the *Woolwich Surveys* was in compilation he was induced by our late Editor to place the whole of his local records in the hands of those responsible for the work, and in fact the lists of localities and species made by him formed the basis for the sections devoted to Coleoptera and Hemiptera. There is also a long article in the *Ent. Record*, vol. xviii., giving an account of the Lepidoptera met with in and around Greenwich and Lewisham.

His collections of the Lepidoptera were sold when he began to work Coleoptera in earnest; first the Macros, and subsequently the Micros. Last November he presented his collection of Hemiptera to the British Museum (3,463 specimens), and at the same time he gave his Coleoptera to his great friend, and the companion of most of his later rambles, Mr. S. R. Ashby. The few books he had passed to the S. London Society. On the evening of July 30th, he had been sitting alone in his room, when his daughter going to call him, found that he had passed away in his chair without a struggle. He was in his 85th year.—H.J.T.

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Duplicates.—Phigalia pedaria, melanic and intermediate forms in great variety.

Desiderata.—Numerous common species.—M. Corbett, 3, Thorne Road, Doncaster.

Mr. Donisthorpe will still be glad to receive ants and Myrmecophiles from all parts of the British Isles, and to name any such for anyone who is kind enough to send them to him. He would however suggest that ants from any other parts of the world be sent to his colleague, Mr. W. C. Crawley, 29, Holland Park Road, W. 14. Mr. Crawley is specialising on the ants of the world, and it is a matter for congratulation that we should possess an Entomologist in this country whose whole attention should be concentrated on this branch of Entomology.

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m. 1920, October 6th and 20th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E. 3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street, E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. (No Meetings in July or August.) Visitors welcomed. Hon. Sec., W. E. Glegg, 44, Belfast Road, N. 16.

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Ants from Mesopotamia and North-West Persia (concluded).

By W. C. CRAWLEY, B.A., F.E.S.

Sub-family V. CAMPONOTINÆ, Forel.

Acantholepis frauenfeldi, Mayr. ♀ ♂. N.E. of Baghdad, 1918, and several other localities (Evans).

Plagiolepis pygmaea, Latr. ♂. Amara, 1918 (Evans).

Prenolepis (Nylanderia) jaegerskioldi, Mayr. Baghdad, 1917, Amara, 1918 (Buxton). N.E. of Baghdad, 1918 (Evans).

Lasius alienus, Först. ♂. N.W. Persia, 1919 (Buxton).

L. emarginatus, Ol., var. *nigro-emarginatus*, For. ♂ ♀ ♂. N.W. Persia, 1919 (Buxton). Attending *Aphis buxtoni*, Theo., on *Umbelliferae*.

These examples of this intermediate variety come nearer to *emarginatus* than to *niger*.

L. brunneus, Latr. ♂. Enzeli, Caspian, 1919 (Buxton).

Though somewhat paler than the typical *brunneus*, and having the frontal groove less distinct, they appear in all other respects identical with the type.

Cataglyphis albicans, Rog., subsp. *viaticoides*, And., var. *lutea*, Em. ♂. Amara, 1918 (Evans).

C. albicans, Rog., subsp. *viaticoides*, And., ? var. N.E. of Baghdad, 1918 (Evans). These specimens seem to vary slightly from the typical *viaticoides*, but not sufficiently to constitute a true variety.

C. bicolor, F., var. *turcomanica*, Em. ♂. Tiflis, 1919 (Buxton).

Cataglyphis bicolor, F., var. ***protuberata***, var. nov.

♂ Major. L. 9.0 mm.

Colour (type), dark brown-black; funiculi and tarsi reddish-brown, gaster with a faint metallic lustre.

The colour in head and thorax varies from dark brown, almost black, to a dark red, lightest on head, deepening along the thorax to the petiole which is dark brown. In the red forms the articulation of the legs, the antennæ and mandibles, are red. The apex of each segment of gaster has a pale yellowish border.

Fourth joint of maxillary palpi slightly longer than 3rd, the 5th much longer than the 6th. Palpi fringed with moderately long hairs, not so long as in *bicolor*. Head quadrate; clypeus with central portion raised and with a slight keel, the anterior border feebly concave. Eyes situate in posterior 3rd of sides of head. The scape passes the occiput by a 3rd of its length. Mesonotum in profile feebly convex or quite flat; on each side, just below the centre, the mesonotum bears a short blunt protuberance, slightly sloping forwards. These protuberances vary in size, are largest in the largest ♂, absent or barely discernible in the ♂ media, and entirely absent in the small ♂. Node of petiole viewed from above, rounded, slightly broader than long; in profile it is broad and low, rounded above, convex anteriorly and nearly straight behind. Legs very long.

Mandibles coarsely striate. Head entirely matt and microscopically reticulate with a few punctures on cheeks. Frontal area somewhat shining. Sculpture on thorax and node similar to that on head, but more shining. Gaster microscopically reticulate.

A moderately long beard under chin; a few long hairs on clypeus; a few short ones on pronotum, epinotum and scale. A grey pubescence on thorax, epinotum and scale, most abundant on epinotum. Antennæ without hairs.

♂ Minor. L. 6.0 mm.

Head red, thorax and node darker red. Anterior border of clypeus more distinctly emarginate. Scapes proportionately longer; mesonotum saddle-shaped and without protuberances, the node lower, and the whole insect more slender. Otherwise resembles the ♂ major. Length of scapes and shape of mesonotum in ♂ media intermediate between ♂ maxima and minima. Amara, 1918 (Buxton).

I have given a somewhat detailed description of this variety of
OCTOBER 15TH, 1920.

bicolor as the presence of the blunt projections on the mesonotum is, as far as I am aware, unique in this genus. The end of the process is obliquely cut off, and has no resemblance to the spines in *e.g.*, the genus *Polyrhachis*. The ant, according to the specimens I received, is somewhat smaller than *bicolor*, i.sp., which, in specimens I took in Egypt, attains a length of 12.0mm.

Evans captured a few examples of this variety, two of which were sent to me, with the note that both specimens were found coming out of the same hole in the sand. The ♂ major is typical, but the ♀ minor is entirely orange yellow, with the gaster paler, and is altogether a stouter insect than the ♂ ♀ minor taken with Buxton's examples.

Formica rufibarbis, F. ♂. N.W. Persia, March, 1919 (Buxton).

Camponotus (Myrmoturba) maculatus, F., subsp. *thoracicus*, F. var. *aerxes*, For. ♂ 4 ♀ ♂. Amara, 1917 and 1918. ♂ and ♀ (Buxton). Evidently extremely abundant.

C. (Myrmoturba) maculatus, F., subsp. *thoracicus*, F., var. ?. A single ♀ minor. Probably var. *oasium*, For., or possibly var. *fellah*, For., but impossible to determine without a ♂ major.

Polyrhachis simplex, Mayr. ♀. Burragh, Mesopotamia, 1919 (Evans).

Camponotus (Myrmoturba) maculatus, F., subsp. **evansi**, subsp. nov.

♂ major (? media). L. 8.5-9.0mm. Width of head 2.3mm.

Castaneous; scale darkest, head slightly darker than thorax, legs palest; gaster shining black, borders of segments rimmed with castaneous yellow.

Whole insect robust, legs short. Head slightly broader than long, widest just behind the eyes, narrowing abruptly in front of eyes, which are well behind the middle of sides of head. Occipital border widely and shallowly emarginate. Mandibles 7 toothed. Clypeus carinate on its posterior two-thirds only. anterior border straight. Scapes extend just beyond occipital border. Eyes large. flat. Thorax in profile short, regularly arched as far as the meso-epinotal suture whence the base of epinotum slopes down in a more or less straight line to meet the declivity, making a very obtuse angle with the latter, which is quite straight and somewhat shorter than the base. Tibiæ somewhat flattened. Scale narrow at apex, convex anteriorly and straight behind. Gaster oval, hardly larger than the head.

Mandibles shining, with coarse punctures. Head dull, with a reticulate ground sculpture pitted with irregular somewhat elongate punctures, most abundant on the clypeus, cheeks, and between the frontal carinae. Vertex and occiput with only scattered shallow punctures. Thorax with a finer reticulate ground sculpture, and more shining than the head; scale, legs and scapes with a similar reticulate sculpture. Gaster shining, with a superficial transverse reticulation. Declivity of epinotum shining, microscopically transversely reticulate.

Head, thorax and gaster with rather long scattered yellowish hairs, whitish on gaster; no pilosity on scapes or legs. Pubescence nil.

♀ minor.

Differs only in size, slightly smaller head proportionately, and greater length of scape.

In dead palm trunk, N.E. of Baghdad, 1919 (Evans).

APPENDIX I.

Pheidole megacephala, subsp. *punctulata*, Mayr. 4 ♀ Durban, 1917 (Buxton).

Ph. capensis, Mayr., ? var. *drejei*, Em. 4 ♀ Natal, 1917 (Buxton).

Prenolepis (Nylanderia) traegaordhi, var. *natalensis*, For., ♀ Natal, 1917 (Buxton).

APPENDIX II.

Monomorium (sensu stricto) pallidum, Donisthorpe. Figs. 2 and 2a.

[*Monomorium* (*Paraholcomyrme*) *destructor*, Jerd., var. *pallidus*, Donisthorpe (*Ent. Rec.*, xxx. 10, p. 166, 1918).]

♂. L. 2.0 mm.

Monomorphic. Entirely pale yellow, in some specimens the apical half of first segment of gaster and the following segments very slightly darker.

A few stiff hairs on clypeus, head, pronotum, nodes and gaster; antennæ hairy but without exerted hairs. Short scanty adherent hairs scattered over head and legs.

Mandibles 4-dentate. Anterior border of clypeus straight, the central portion concave and bounded on each side by a well-defined carina. Head elongate-oval, posterior border almost straight. Eyes just in advance of middle of sides. The scapes extend barely beyond occipital border. Club of funiculus 3-jointed, all the joints much longer than thick; the second is much longer than the first, and the apical joint is longer than the two following taken together. The rest of the joints are approximately equal except the first.

Thorax with a fairly deep incision; the angle between base and declivity of epinotum rounded; dorsum of epinotum flat, not longitudinally impressed. Stalk of petiole rather short; first node hardly higher than second, broad at base; the second broader, rounded.

Mandibles striate along the flattened outer border, smooth and shining towards apex. Clypeus smooth and shining. Head entirely smooth and shining, with a few minute piligerous points, pronotum also smooth and shining; rest of thorax and epinotum closely thimble-punctured, pedicel less so. Gaster entirely smooth and shining.

♀ (Hitherto undescribed). L. 4.5 mm.

Yellow, but a deeper shade than the ♂: a narrow V-shaped mark on scutum, a patch on each side of mesonotum, the wing insertions and borders of ocelli brown; a band, broadening at the sides, along the apical border of first segment of gaster, and the whole of the remaining segments of gaster dark brown; extreme apical borders of segments yellow. Pilosity as in ♂, but longer. Head longer than broad, but shorter proportionately than in ♂; occipital border shallowly excavated; scapes somewhat shorter proportionately; eyes large, slightly in advance of middle of sides. Dorsum of thorax almost horizontal; epinotum descends abruptly with hardly any division between base and declivity.

First node narrower in profile than in ♂. Gaster large, oval. Head with a superficial longitudinal striation; thorax shining, with a few small punctures, epinotum and pedicel as in ♂; gaster shining.

♀, Amara (Buxton) 1918; N.E. of Baghdad (Evans) 1918, with a single deâlated ♀.

Recorded in 1918 by Donisthorpe* as a colour variety of *M.* (*Paraholcomyrme*) *destructor*, Jerd. The characters of the subgenus *Paraholcomyrme*, however, as defined by Emery (*Bull. Soc. ent. Fr.*, p. 191, 1915) are: ♂ ♀ somewhat dimorphic, first and second joints of club of antennæ visibly equal. *Pallidum* has the first joint of club considerably shorter and narrower than the second, and its ♂ ♀ are monomorphic; it will therefore rank as a species belonging to the subgenus *Monomorium* (s.str.).

* Specimens were sent by me to Mons. Emery as I was unable to make it agree with any known species and he returned them to me as a pale form of *M. destructor*. I therefore described it as a new variety of that species. I entirely agree with Mr. Crawley that it is a new species.—H.St.J.D.

EXPLANATION OF PLATE.

- Fig. 1. Thorax and pedicel of *Monomorium* (s.str.) *buxtoni*, sp.n.
 „ 2. „ „ „ „ „ „ *pallidum*, Donisthorpe.
 „ 2a. Funiculus of antenna of „ „ „ „ „ „ „ „
 „ 3. Thorax and pedicel of *Messor platyceras*, sp.n. „ „ „ „
 „ 3a. End of scape and first 3 joints of funiculus of same.

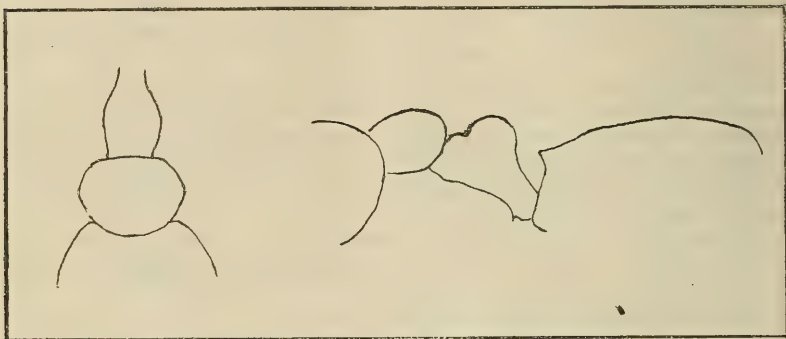
ERRATA.—Pl. V., figs. 2 and 2a, *mariae*, sp. nov. should read *pallidum*, Donisthorpe.

A new species of Ant imported into England.

By W. C. CRAWLEY, B.A., F.E.S.

Cardiocondyla Brittzeni, sp. nov. Fig.

♀. Length 1.8 mm.

THORAX AND PEDICEL OF *CARDIOCONDYLA BRITTENI*, SP. NOV.

Colour red-brown, shining; scape, 1st joint of funiculus, mandibles and legs, yellow; rest of funiculus, the epinotum, and gaster, dark brown; head, thorax, and pedicel, reddish, front of head darker.

Pilosity. A few short adpressed hairs on body, principally on head and gaster; legs and antennæ without hairs.

Structure. *Head*, excluding mandibles, $\frac{1}{2}$ longer than broad, widest at eyes, which are placed at anterior third of sides of head; sides feebly convex, occipital border slightly concave. Scares reach the posterior $\frac{1}{4}$ of head. Club much longer than rest of funiculus, the last joint alone equalling the following eight; joints 2-8 of funiculus thicker than long.

Thorax somewhat stout; seen from above very slightly constricted at meso-epinotal suture, which is almost obsolete. In profile the dorsum presents an unbroken slightly convex line, with only the faintest suggestion of an impression at the junction of meso- and epinotum.

Epinotum. First half of base of epinotum in a line with dorsum of thorax; thence descending in a gentle curve to the spines, which are short and thick, slightly directed outwards, as long as broad at their bases.

Pedicel. First node from above longer than wide, the sides almost parallel; second node nearly twice as wide as first, $\frac{1}{4}$ wider than long, widest in centre, the anterior border almost straight; in profile the stalk of the petiole is not quite so long as the rest of the segment, and bears a minute tooth underneath in front; the first node is higher than the second, and rounded.

Gaster oval.

Sculpture. *Head* covered with a fine puncturation which grows sparse and faint as the occiput is reached; the sculpture does not dull the surface. Mandibles smooth and shining.

Thorax very sparsely and shallowly punctured, similarly to the occiput, the punctures almost disappearing towards the epinotum.

Epinotum. Sides finely granulate, the rest smooth and shining.

Pedicel almost impunctate.

Gaster entirely smooth and shining.

A single ♀ was taken by Mr. H. Britten among butter beans, at West Didsbury, on May 12th, 1919. It is highly probable that the ant was imported with the beans, in which case its place of origin would be tropical America, but beyond this there is no clue.

It is remarkable for its smooth and shining integument, not even the head being rendered opaque by the sculpture. The petiole is narrower than in *emeryi*, For., the postpetiole is wider in proportion to its length and the sides more angular, and the spines on the epinotum

shorter and thicker; compared with *nuda*, Mayr., the postpetiole is wider still in proportion to its length. The shape of the pedicel, as seen from above, appears to come nearest to *batesi*, For., but both nodes are higher in profile.

"The Phoresy of Anthrophagus."

By HORACE DONISTHORPE, F.Z.S., F.E.S., etc.

In 1919 my friend Professor W. M. Wheeler published a most interesting and able paper on the Phoresy of *Anthrophagus*. The following is a resumé of this paper, together with a few notes, and additions to the facts and literature of the subject, known to me.

On August 16th, 1919, while collecting near Colebrook, Wheeler observed a worker *Bombus vagans* behaving in an erratic manner on the flowers of golden-rod. The *Bombus* repeatedly attempted to insert its proboscis into the flowers, but did not succeed because a female of *Anthrophagus ochraceus*, Mels., was firmly attached by its mandibles to the right maxilla and the tongue. It did not release its hold in the cyanide jar, and Wheeler shows it in its original position in the accompanying figure to his paper. He failed to find any record of such behaviour in the American *Anthrophagi* (*ochraceus*, *convexus*, and *suturalis*), but a perusal of the accounts of the European species (*nigricornis*, *silaceus*, and *pallens*) yielded a satisfactory explanation. In 1896 Lesne called attention to insects that ride on larger ones, and applied the term "phoresy" to this phenomenon, showing that it is distinguished from ectoparasitism by the fact that the portee does not feed on the porter, eventually dismounting and having no further relations with the latter. Janet, in 1897, expanded the concept, distinguishing six different categories;

(1) Cases like that of the small flies of the genus *Limosina*, which ride on the dung-beetle, *Ateuchus*, and represent phoresy in its typical form as conceived by Lesne.

(2) Cases in which the portee is conveyed to the nest of the porter, like the triungulin larvæ of certain beetles (*Sitaris*, *Meloe*, etc.), and the triungulins of the Strepsiptera.

(3) Cases like a few myrmecophilous beetles (*Thorictus*), which attach themselves to the antennæ of ants for the purpose of accompanying them on their peregrinations.

(4) Cases like the mites of the genus *Antennophorus*, which are not only carried but fed by the ant. These and the cases under (3) might be referred to ectoparasitism.

(5) Indirect phoresy, as exhibited by certain mites that cling to the surfaces of ant larvæ and pupæ, which are in turn transported by the ants.

(6) The case of ants that carry in their mandibles their own young, other members of the colony, or guests.

In 1911 Banks published some 17 cases of phoresy collected from the literature, others being recorded by Warren (1903), Braes (1917a, 1917b), and Rabaud (1917). These authors cited cases of parasitic Hymenoptera which attach themselves to the abdomens of Orthoptera, or the wings of Mantoidea, in order to be on hand to oviposit in the eggs of their porters; such cases representing a seventh category.

Lesne and Janet cited the case of *Anthrophagus* (overlooked by

Banks), which attaches itself to the legs, mouthparts, or antennæ of humble-bees, for the purpose of being transported to their nests. The earliest observation of this habit was made by the British Coleopterist, T. J. Bold, in 1856. He wrote: "Mr. Smith, in his admirable work on British bees, records the finding of *Antherophagus glaber* in the nest of *Bombus derhamellus*. This season I met with an instance of the manner in which such insects may be transported thither. When hunting *Bombi* in September last, the peculiar motions of a neuter of *B. sylvarum* attracted my attention; it was clinging to a thistlehead, and wriggling and twisting its legs about in all directions. On getting hold of it I found that a large specimen of *Antherophagus nigricornis* had seized the tarsus of a hind leg between its jaws, and was holding on like grim death. I put both into my bottle, and the *Antherophagus* retained its hold until both were killed by the fumes of the laurel."

Redtenbacher (1858) recorded taking three *A. nigricornis*, together with a number of its larvæ, in a humble-bee's nest. In 1863 Carus and Gerstaecker published the following note on the genus *Antherophagus*: "The species live on flowers, attach themselves to humble-bees, and permit the latter to transport them to their nests, probably for the purpose of oviposition; at any rate, small larvæ resembling those of *Cryptophagus* are sometimes found among the beetles in the nests of humble-bees."

Eichoff (1866) found that *A. nigricornis* was nearly always present, and single specimens of *silaceus* and *pallens* occurred in *Bombus* nests.

Gorham (1869) captured *A. pallens* in a nest of *Bombus pratorum*.

Perris (1869-'70) took in the Pyrenees *A. nigricornis* attached to the antenna of a *B. montanus*.

Bugnion (1869-'70) took a *Bombus* in the Alps of Vaud, in August, 1866, which had an *A. pallens* attached to its proboscis.

Seidlitz (1869-'70) records the occurrence in a museum collection of three *Bombi*, each with an *Antherophagus* attached to an appendage.

In 1875 Perris published a description of the larva of *A. silaceus* taken from a nest of *B. sylvarum*.

Hoffer (1883), Fowler (1889), Sharpe (1899), Wagner (1907), Reitter (1911), Sladen (1912), and Reuter (1913), give brief notices, and Wagner published a figure of *A. nigricornis* attached to the bee's proboscis.

Of the North American *A. ochraceus*, Wheeler points out that Packard (1864) recorded its capture by Putnam in *Bombus* nests in Massachusetts and Vermont, and J. B. Smith (1909) noted its occurrence in *Bombus* nests.

Wheeler says that though possessed of well-developed wings and able to fly about and take up their position on flowers, *Antherophagus* does not seek out the *Bombus* nests, but compels the bee to carry it to the place in which its eggs and larvæ are developed, and quotes Sharp (1899): "We must presume that its senses and instincts permit it to recognise the bee, but do not suffice to enable it to find the bee's nest." Wheeler states: "The structure of the mandibles and the peculiar notch in the clypeus are clearly adaptations to firmly grasping the more or less cylindrical joints of the bee's appendages, and the red color of the integument and investment of golden-yellow hairs, so very suggestive of conditions in many myrmecophilous beetles, may account for the fact that the *Antherophagi* live unmolested in the *Bombus* nests."

Wheeler, after quoting the different views expressed by authors on the feeding habits of *Antherophagus* and its larvæ, concludes that the larvæ of these beetles are in all probability merely scavengers in the *Bombus* nests.

PHORESY.

I would attribute the case of the myrmecophilous mite *Laelaps equitans* to category (1). This species was described by Michael in 1891 from specimens taken by him in Italy in nests of *Tetramorium caespitum*. On 22nd April, 1907, I discovered it in a nest of the same ant situated under a large stone at Whitsand Bay, Cornwall. The mites were riding on the ants, and every now and then would jump off an ant, and spring on to another whilst in motion, with great agility after the manner of a circus-rider. This was again observed in the same locality on 17th April, 1909 (1910) and on Lundy Island 11th April, 1913. On July 9th this year, this mite was observed in a nest of the same ant at Porthcothan Bay, Cornwall. They were riding on the ants, resting on the heads or on the gasters of the porters; but on this occasion they were not seen to jump on and off, which led me to think they might belong to another species. The Rev. Hull, however, tells me they are *L. equitans* without doubt. Whether this difference in behaviour was on account of the day being dull without sunshine, or the time of year being later, I am unable to say. In every case, however, the mites were adults, and not immature forms.

Laelaps oophilus, which occurs with ants of the genus *Formica*, may be classed in the 5th category, when it nests on and among the egg masses of the ants. It is fed however when the ants lick their eggs (Syntrophy), and is of course carried about by the ants, when they move their packets of eggs. (This species was unfortunately recorded as *L. equitans* in 1902, from specimens taken by me on and among the egg-masses of *Formica rufa* at Oxshott and the Blean Woods in May, 1901.) Later in the year when the ants' eggs have hatched it may be found on the bodies of queen ants (1907), when it comes under the first category.

Beetles of the genus *Claviger* may also come under two classes. They are placed in the sixth category by Janet (1897) when they are carried by their hosts; but they might also be put in the second. The first specimen of *C. testaceus* taken in Britain was captured by Westwood in Oxfordshire in 1838, in a nest of *A. (C.) flavus*. It was attached to a winged ant (♂) on the underside. This, as pointed out by me in 1909, suggests a possible method of being taken out of the old nest to new ones.

The little blind beetle, *Leptinus testaceus*, is placed by Janet in the first category when lodged in the fur of little mammals to enable it to be carried to the nests of species of *Bombus*. Ruschkamp however (1919) who made a careful study of its habits, is doubtful if it should be considered a case of Phoresy or Ectoparasitism.

ANTHEROPHAGUS.

It may be suggested that the reason why *Antherophagi*, instead of seeking out the nests of *Bombi*, lie in wait for the bees which come to flowers and seize hold of them, thus compelling the latter to carry them to their nests, is not so much that they lack the instinct to find the

bees' nests, but rather that it gives them protection from their hosts when they arrive there. In the case of the permanent social parasitic ant, *Anergates atratulus* (1915), as shown by Crawley and myself in our experiments when introducing it into nests of its host, *Tetramorium caespitum*, the *Anergates* female seized hold of, and held firmly on to, the antenna of a *Tetramorium* worker; and as long as the grip was maintained, this action appeared to render it safe from the attacks of the owners of the nest. As with the ant, the beetle may thus obtain the nest "aura" of its hosts.

The notch in the clypeus of the *Antherophagus*, so well explained by Wheeler, reminds me of the notch in the clypeus of the slave-making ant *Formica sanguinea*. It has also been suggested that this is an adaptation to carrying the cocoons captured from the nests of the slave species.

I can add the following facts in connection with *Antherophagi* being found in Humble-bees nests, to those mentioned by Wheeler.

In 1896 and 1897 Tuck records finding specimens of *A. pallens* in nests of *B. agrorum*, *B. lapidarius*, and *B. sylvarum*, and *A. nigricornis* in nests of *B. latreillellus* and *B. terrestris*, in the Bury district, Suffolk.

In 1898 Bouskell when recording the capture of *A. nigricornis* on low parsnip blossoms, etc., in Buddon Wood, Leicestershire, remarks: "The fact of the beetle frequenting flowers like the fox-glove, infers a desire to be conveyed to the nest [of a *Bombus*], probably for the purpose of oviposition."

In 1900 Buckle took specimens of *A. nigricornis* in a nest of *B. terrestris* in the Foyle district in Ireland.

In August, 1904, I found a nest of *Bombus muscorum* near Lyndhurst in the New Forest. The comb was in a hollow in the ground and was covered over with bits of cut-up leaves and grass. On digging up the nest a specimen of *Antherophagus silaceus* was found in company with a number of *Cryptophagus setulosus* and a few other beetles.

On August 21st, 1906, I found larvæ of *Antherophagi* in a *Bombus* nest at Kingsclere. These were never recorded.

In 1909 Dollman and I dug up a nest of *Bombus muscorum* at Sandown, I. of Wight, in which a specimen of *A. pallens* was found. This was on August 15th, 1908, and the actual locality was the foot of "Limpet Run."

Cottam records in 1909 finding *A. pallens* and its larvæ in nests of *B. muscorum* in Derbyshire.

On August 28th, 1911, Dollman found a large nest of *B. hortorum* situated quite 3 ft. down in a large complex rabbit-burrow, and after digging it up with considerable difficulty captured a specimen of *A. pallens* in it.

In 1920 Scott in an interesting paper on some inhabitants of a nest of *B. derhamellus* received from Hoo near Rochester in 1918 records among other insects, the presence of three *Antherophagus* larvæ. Two of these he reared which proved to be *A. pallens*, and he gives some valuable notes and detailed observations on the pupation, etc. He was unfortunately unaware of Bold's records, and apparently of Wheeler's 1919 paper; as he credits Perris (1877) with the first observation on an *Antherophagus* clinging to a *Bombus*, and secondly

Trautman (1915), who recorded finding *A. nigricornis* on a living humble-bee.

LITERATURE.

The Literature given by Wheeler in his paper is marked here with "W"; and the references by Scott in connection with *Antherophagus* with "S."

- W. 1911. Banks, N. "Cases of Phoresie." *Ent. News* **22** 194-97 (1911).
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New species and sub-species of S. American Lepidoptera.

By W. J. KAYE, F.E.S.

FAMILY HELICONIDAE.

Heliconius xanthocles, Bat., *flavosia*, sub-sp. nov.

Very like the figured form of *H. xanthocles* sub-sp. *cethosia*, Seitz (*Mac. Lep.* v. pl. 77a), from which it differs in that instead of having a discal patch of yellow beyond the cell it has it extending inwards and occupying about one-third of the cell area. The discocellular strongly black. Hindwing with the red rays only extending half-way across wing as in *cethosia*.

Habitat. E. Colombia, Villavicencia, Feb., 1919, ♂.

Susamuco, Sep., 1917, ♀.

Type from Villavicencia, in coll., Kaye.

Heliconius vulcanus, Btlr.; *tenuistriga*, sub-sp. nov.

Forewing with the discal red band greatly reduced in width, being about one half the width of *vulcanus* sub-sp. *cythera*, Hew. The red only on outer half of band, inner half white. Hindwing with the marginal white band broad as in *cythera*.

Habitat. Ecuador, Balzapamba.

This may be only an aberration as *cythera* is found at Balzapamba. The two may occur at different elevations.

Type ♀ in coll. Kaye.

FAMILY PIERIDAE.

Hesperocharis nera, Hew., *potara*, sub-sp. nov.

A strongly marked race with a heavier black border than in typical *nera*, and with strong orange dashes between the veins and also orange at base. Forewing below with some orange dashes on the inner edge of black marginal band in the apical area. Hindwing below with a broad blackish margin with a pair of yellowish streaks at anal angle within the band. Inner area of wing wholly creamy white ground colour with intra-nervular orange streak and a double orange streak within the cell.

Habitat. Central British Guiana, Tumatumari.

Type in coll. Kaye.

Hesperocharis lamonti, n.-sp.

Forewing above white with a slight creamy shade (but much less so than hindwing). Costa at base slightly orange. Apex rather broadly black, strongly toothed internally. The black is extended down outer margin gradually lessening to tornus where it disappears. The black is heaviest at the veins and receding between them. Hindwing above creamy white with an orange patch on costa at base. Outer margin very narrowly edged with black, and most conspicuous at anal angle. Forewing below with costa and apical area (covered by the black above) washed with orange extending as a still paler wash of orange to cell. Hindwing below cream colour, but nearly covered with broad streaks and dashes of pale orange between the veins and within the cell. A minute pink dot at base. Exp., 56mm.

Habitat. Trinidad, Morni Diable, 2 ♂♂, 6-iv.-1917 (N. Lamont).

Type in coll. Lamont.

Glutophrissa drusilla, Cr., *jacksoni*, sub-sp. nov.

♂ above completely white with glistening scales at base of forewing. Faint yellow at base of forewing below. ♀ except for shorter wings much like the male and with only a trace of black at apex of forewing. Ground colour creamy white, not dead white, as in ♂. Glistening scales at base of forewing strongly developed and occupying a larger area than in ♂. Hindwing with faint yellow scaling at base above. Below entirely shiny creamy white as in the apex of forewing beneath. Exp., ♂ 63mm., ♀ 55mm.

Habitat. Jamaica. 800 ft. (Dr. F. W. Jackson.)

Type in coll. Kaye.

This Jamaican race of *Glutophrissa drusilla* is quite distinct from the Cuban race (*ilairae*, Poey), or the St. Domingo race (*poeyi*, Butl.). The whole species is very variable both geographically and individually

and most probably seasonally. In Trinidad the ♀ ♀ vary from having hardly a trace of black outer margin of hindwing to a very heavy black band, while the ground colour varies from white to a fairly strong yellow. These extremes belong most probably to different seasons of the year.

FAMILY SYNTOMIDAE.

Mydropastea disparata, n.-sp.

Forewing black with hyaline patches. Tegulae black with metallic green spots and a white point below. Patagia black. Frons black. Femora with conspicuous paired white patches. Abdomen below (in ♂) with large elliptical valve edged with white scales. Last four segments edged with orange. Abdomen above with metallic green stripe and broader lateral green stripes. Forewing with a long wedge-shaped transparent spot within the cell and another beneath the cell. Beyond the cell three or four transparent spots in series vertically; first or second or both sometimes absent. Hindwing black with a large central area chiefly below cell transparent. In the ♂ the space is divided at the lower discocellular. Exp., 42mm.

Habitat. Trinidad, Rock, 1-i.-18, Palmiste, 9-ix.-17 (N. Lamont).

1 ♂, 2 ♀ ♀.

Type in coll. Lamont.

The Lepidopterist Abroad.

Dedicated to my erstwhile entomological mentor and companion.

H. E. WINSER, Esq.

The tropic day ends and my toil is done

Until the morrow, when it starts again,

And sitting by my tent I watch the sun

Die down across the bush and o'er the plain.

It seems a link with England, in a way,

Just now when all the world is calm and still,

Because I know that at this hour to-day

This very sun is red on Hascombe Hill.

As stands that cottonwood* in towering might

Emblazoned on the purple of the sky,

So stand the oaks in Slythurst Woods to-night

—Nor shall they see my lamp go gleaming by!

No! for this year I may not wander there,

My net astream upon the whispering breeze.

(Nor sheltered, like a wizard in his lair,

Prepare my potions to anoint the trees.)

Sibylla flaunts her beauty unafraid;

Euphrosyne may flit adown the dell.

Not mine to follow *paphia* up the glade

Or chase—unknowingly—a battered "shell."

* A cottonwood is an enormous tree of the outline of an oak, but at least three times as high. Very common here on the Gold Coast.

And on the hill may *flavicornis* lie
 All undisturbed upon some twig of birch;
 No longer need *parthenias* mount on high,
 Nor swift *petraria* elude my search.

No more shall Ralli's Clearing hear the shout
 Of vict'ry, as I take some treasured thing,
 Or Smithwood see me slowly prowling about,
 Intent on *rubi*, or what Fate may bring.

Crepuscularia now may find retreat
 Is fairly safe within her favoured grove,
 That crowns the heights of old St. James' Seat;
 And in her glen *prunaria* may rove.

The sallows now may freely open wide
 Their luscious blooms to all the Quaker clan,
 And *miniosa* may drink her fill, nor hide
 Her rosy pinions from the sight of man.

My lamp no more shall cleave the tangled brake,
 Endeavouring to trace some errant bug.
 Nor shall I stalk from tree to tree and take
Leporina or *derasa*—or a slug!

Nor shall I patient watch the lighted sheet,
 Or scour the reed-beds in a humid state,
 Or steal with pockets full of ancient meat
 To plant it near a parson's garden gate!!

For such pursuits are over for a time,
 And I am far away from Surrey's weald.
 My net I flourish in a torrid clime,
 And take whate'er the virgin bush may yield.

Exotics with a wondrous wealth of wing
 In every rainbow colour flutter by,
 In green and gold and purple sheen they bring
 Their fairy visions to the mortal eye.

Across me flits a flash of jewelled light,
 Metallic blue and silver in the sun,
 And though my eye can scarce observe its flight,
 I strike—and thus I miss another one!

'Tis true I've gained my heart's desire to be
 Among these gems that sparkle up and down
 Like living fire—but much I'd give to see
 A common Garden White or Meadow Brown!!!

January 1st, 1920.

L. R. TESCH.

NOTES ON COLLECTING, Etc.

ZYGENA TRIFOLII AND Z. FILIPENDULÆ.—In "Notes on Collecting" of the September issue, a correspondent writing from Cranley, Surrey, suggests that *Z. trifolii* is much more liable to aberrations than *Z.*

filipendulae, and I have observed the same thing with regard to these two species in South Hants (Alverstoke and Portsmouth districts).

In the rough and open part of a wood in which I had previously noted a strong colony of *Z. trifolii*, I took on June 29th, 1919, some ab. *orobi*. In the present year I first observed *Z. trifolii* there on June 13th, and on June 19th I took (but in one particular spot only) a good series of ab. *minoides* and one ab. *glycerhizae*. In this locality *minoides* appears to be the most frequent of the aberrations and I saw many other specimens of this variety at the same time.

I have not noted *Z. filipendulae* at the same spot, though no doubt it occurs there; but on the chalk hills rather nearer to Portsmouth where it swarms in thousands, the large majority are, so far as I have been able to observe, to type, the only varieties I have met with being occasional specimens having the two outer spots joined, or the middle pair joined.—R. BARNARD CRUICKSHANK, Alverstoke, Hants.

POLYOMMATUS ICARUS, VARIETY.—I took in this neighbourhood on May 29th this year a perfect specimen of the variety figured in South's *Butterflies*, plate 119, fig. 5, the whole underside except the outer margins being entirely free from spots, and exactly as figured in South's book; the latter does not however mention any name for this variety, and I should be glad to learn from any of your correspondents what this is.—ID. [This form is usually identified with ab. *persica*, Bienert, but in Tutt's *Brit. Lep.* (iv. 156) it is separated tentatively as ab. *obsoleta*, Clarke (G.W.).]

POLYGONIA C-ALBUM IN NOTTINGHAMSHIRE.—Yesterday, September 19th, I took a specimen of *P. c-album* in my garden here. This is the first specimen I have ever seen in the Midlands, though I see it is recorded from the Mansfield district.—DOUGLAS H. PEARSON (F.E.S.), Chilwell, Notts.

NOTE ON MELANARGIA ARGE.—In *Ent. Rev.*, vol. xxxi., p. 110, Dr. Roger Verity states that contrary to the general rule in butterflies that the males greatly outnumber the females the opposite is the case in *Melanargia arge*. He proceeds to base, in part, on this statement another to the effect that the "increase in the relative number of the females is often proportioned to the localisation and to the scarcity of the species," and he conjectures, therefore, that we have here an example of effort to conserve and enhance generative capacity in the case of a species which is on the way to extinction. I do not know upon whose observations the statement about *Melanargia arge* is based, but it is certainly a most amazing statement and in my experience very wide of the facts. I have observed *Melanargia arge* in the greatest abundance for several years in succession in its haunts near Brindisi; and, if I may judge from what has been published, my acquaintance with the species *in life* is vastly greater than that of any other European lepidopterist, and I can affirm most positively that so far as the Brindisi district is concerned the statement is not true. On the contrary in that area the relative proportion of the sexes is approximately the same as in the case of other *Melanargias*, the males outnumbering the females in the proportion of at least 5 to 1! My observations are based on times when *Melanargia arge* had reached the

high-water mark of its emergence—when it was possible to observe hundreds in the course of a single day. At Brindisi that point is reached about the 10th of May in a normal season; and the text books which give June, and even July, as the time of emergence of this species are, as I have previously pointed out, utterly incorrect. It occurs to me that Dr. Verity's observations may have been made at a time when the species was fast "going over"; that time is the only time in my experience when, amongst the survivors of an emergence, it would be possible to find more females than males.—J. A. SIMES (F.E.S.).

A BREEDING RESULT.—Nothing having appeared under this heading since the original letter (p. 100), may curious readers be enlightened as to the conclusion (if any) arrived at by Mr. Cruickshank. Since he says he placed no other larva in the box with the *villica*, and the *alni* could not have crawled into it as a perfect insect, two alternative explanations occur, *viz.*, either someone else put the moth into the box, or the larva had spun up in the piece of cork, before the latter was introduced for the benefit of the *villica*, and was therefore not noticed by Mr. Cruickshank.—C. NICHOLSON, 35, The Avenue, Hale End, E. 4. September 25th, 1920.

NOTES ON ENTOMOLOGY IN NORTHERN ITALY IN 1919.—On arriving at Turin at the beginning of April I found Nature perhaps rather less advanced than at Vicenza, but still a considerable number of plants were in flower; and during the month I collected at the following localities in the neighbourhood of Turin: the Lakes of Avigliana (A), from the village of Sassi up to the Soperga on the Colle Torinese (S), at the Wood of Stupinigi (St.), and at Montcalieri (M), a place on the bank of the Po about half an hour by the electric tramway, where I had the good fortune to visit Dr. Festa of the Museo Civico di Storia Naturale, Turin, where I saw his small "zoo" and his interesting collection of European butterflies. It was Dr. Festa who told me of the Stupinigi Wood, which is reached in about half an hour from Turin by steam tramway; it surrounds the Royal Palace at the village and proved my best collecting ground while in this part of Italy. I was only able to get one day at the Lakes of Avigliana, which are reached from the station on the Turin-Modane line, and can be "done" in one day's excursion leaving by the first morning train. Sassi is reached by another steam tramway starting also from the Piazza Castello.

During the month of April the following butterflies were noted, the letters attached indicating the localities:—*Papilio podalirius*, S; *P. machaon*, M, S; *Thais polyxena* ab. *meta*, St; *Pieris brassicae*, S; *P. rapae*, M; *P. napi*, M, A, S; *Euchloë cardamines*, A, S, St; *Leptosia sinapis*, M, A, S, St; *Gonepteryx rhamni*, M, S, St; *Issoria lathonia*, M; *Brenthis selene*, St; *B. dia*, M, A, St; *Euvanessa antiopa* (hiber.), S, A, M, St; *Vanessa io* (hiber.), S, A, M, St; *Polygonia c-album*, M, S, St; *Pararge aegeria*, M, S; *Coenonympha pamphilus*, A, St; *Rumicia phlaeas*, A, S, St; *Callophrys rubi*, St; *Everes argiades*, M; *Celastrina argiolus*, M, A, S; *Hesperia malvoides*, M, A, St; ab. *taras* (one), M; and *Nisoniades tages*, M, A, S, St.

I should say that I first hit upon *T. polyxena* ab. *meta* on April

24th, by which date many of the males were getting very worn although the females were in excellent order. They were quite confined to one quarter of the Stupinigi Wood, just after the river Sangone is crossed by the bridge of the road from Mirafiore. Crossing this bridge, and continuing on the main road, another stream is reached in a few minutes. Crossing this stream, and taking a narrow path to the right alongside it, in a few minutes a partial clearing is reached, about 150 yards from the road, which, as far as I could discover, is the only real home of this species near Turin. Only a few stray specimens were met with in the neighbourhood of this spot.

During the whole time at Turin I was only able in a general way to get the day-flying moths, the following occurring in April:—*Saturnia pavonia*, A. M.; *Plusia gamma*, M.; *Heliaca tenebrata*, M.; *Euclidia glyphica*, M.; *Ematurga atomaria*, M. A. S.: and *Lozogramma clathrata*, M. A. St.

In the other Orders the following is a list of species noted:—

NEUROPTERA.—*Panorpa communis*, St.

ODONATA.—*Libellula depressa*, St; *Gomphus vulgatissimus*, M.

HYMENOPTERA.—*Vespa crabro*, St; *Apis mellifica* var. *ligustica*, M; *Bombus terrestris*, M, A, S, St; *B. agrorum* var. *pascuorum*, A, S, St; *B. hortorum*, S, St; var. *harrisellus*, A; *B. pomorum*, S, St; *B. lapidarius*, M; *B. ligusticus*, M, S; *B. sylvarum*, St; *Xylocopa violacea*, M, A, S; *Eucera longicornis*, M, St; *Anthophora acervorum*, M, St; *A. dispar*, M; *Osmia aenea*, M; *Andrena thoracia*, A; *Nomada succincta*, M, St; *Melecta luctuosa*, A.

DIPTERA.—*Eristalis aenea*, M.; *C. arbustorum*, M.; *Chrysotoxum maculatum*, A.; *Bombilus medius*, S.

COLEOPTERA.—*Cicindela campestris*, M.; *Cetonia aurata*, A.; *C. hirtella*, A. M. S.; *Melolontha vulgaris*, M.; *Synaptus filiformis*, M.; *Cantharis fusca*, M.; *Lema brunnea*, S.; *Lina populi*, M.; *Meloe proscarabaeus*, St.

ORTHOPTERA.—*Gryllus campestris*, A.

In and around Turin I recognised during April 88 different species of plants in flower.

With the advent of May much hotter weather was experienced, and many fresh species of insects and plants in flower were noted. Of the latter, 56 fresh species were recorded in blossom in the month. The banks of the river Stura (Str.) was a fresh locality, reached from the Municipio by electric tram in about half-an-hour.

RHOPALOCERA: *Aporia crataegi*, Str.; *Brenthis euphrosyne*, S.; *Melitaea cinxia*, St.; *M. athalia*, St.; *M. phoebe*, S. St.; var. *occitanica*, St.; *Aglais urticae*, Str.; *Limenitis camilla*, St.; *Epinephele jurtina*, St.; *Coenonympha arcania*, St.; *Chrysophanus dispar* var. *rutilus*, Str. (one perfect ♂ on May 8th); *Loweia dorilis*, St.; *Plebeius aegon*, Str. St. M.; *Glaucopteryx cyllarus*, St.; *Polyommatus icarus*, Str.; *Agriades thetis*, St.; *Scolitantides baton*, S.; *Hamearis lucina*, S.; *Hesperia carthani*, St.; *Augiades sylvanus*, S. St.

HETEROCERA.—*Dasychira pudibunda*, in Turin; *S. pavonia*, in Turin; *Heliothis dipsacea*, Str.; *Idea ornata*, St.

PSEUDONEUROPTERA.—*Perla bicaudata*, Str.

ODONATA.—*Calopteryx virgo*, St.; *C. splendens*, Str.; *Pyrrosoma nymphula*, Str.; *Agrion pulchellum*, Str.; *A. puella*, Str.

HYMENOPTERA.—*Bombus hortorum*, St.; *Clavellaria amerinae*, St.;

Vespa vulgaris, St. ; *V. germanica*, St. Str. ; *Polistes gallica*, St. M. ; *Anthophora grisea*, St. ; *Halictus sexfasciatus*, S.

DIPTERA.—*Pachyrhina crocata*, St. ; *Volucella pellucens*, St. ; *Chrysotoxum elegans*, S.

COLEOPTERA.—*Lacon murinus*, St. ; *Trichodes alvearius*, St. ; *Hammaticherus cerdo*, S. ; *Aglastica albi*, St. ; *Chrysomela menthastri*, St.

RHYNCHOTA.—*Cercopis sanguinolenta*, St. ; *Meracurus marginatus*, St.

ORTHOPTERA.—*Locusta viridissima*, S.—Lieut. E. B. ASHBY, 36, Bulstrode Road, Hounslow. (*To be continued.*)

CURRENT NOTES AND SHORT NOTICES.

John Taylor, of Sandown, Isle of Wight, passed away on July 21st, 1920, after several years' illness, at the age of 56. Always deeply interested in Nature he, eventually, became an ardent collector of Lepidoptera and Coleoptera, and we owe much of our knowledge of the species inhabiting the Isle of Wight to his strenuous work. Of a quiet and retiring disposition, he did not contribute much to the literature of the subject, but some valuable notes on captures may be found in the magazines. He was always ready to supply fellow workers with information on the subject, and his own cabinets were the poorer for the many generous gifts to others, often comparative strangers. Without the cares of a business he would, doubtless, have become one of our leading Coleopterists.—H.F.P.

Entomology in the United States has been largely, in fact predominantly, worked from an economic standpoint, supported mainly by the governments of the different states. A result of this has been that the National Collections of Insects have been made from that point of view, and hence are very deficient in specimens from other parts of the world, and although an excellent mass of material from the Western Hemisphere has been accumulated, there is little from the rest of the world ; a student who wishes to take up a line of study more extended than a knowledge of his own fauna, is so handicapped that he must come over to Europe to complete his study, and for comparison of faunas. This want has been under consideration for some time, and recently there has been discussions between the committees of the Entomological Society of America and of the American Association of Economic Entomologists. These two bodies have now issued a combined report which, no doubt, will result in active means being taken to remedy the defect.

A Revision of the Nearctic Termites, by Nathan Banks, issued by the Smithsonian Institution, is a valuable summary of what is known up to the present. It contains notes on the biology and geographical distribution of the various species, and is illustrated with 25 plates, numerous figures in the text, and a series of maps showing the range of the more important species. The biological notes deal with nests, subterranean species, wood-inhabiting species, food, damage (character and extent), remedies, preventatives, function of the "swarm" (colonising flight), diurnal swarming, nocturnal swarming, variations of swarming, foundation of new colonies, loss of wings, courtship, mating, egg-laying, metamorphosis, castes, parasites (fungi, protozoa, nematodes, mites, predators, termophilous insects, and association with ants.

Other recent publications of the Institution deal with "Forest Lepidoptera with descriptions of larvæ and pupæ," illustrated by 13

plates, "New species of Lepidoptera from Mexico and Guatemala," described largely in the noncomparative style, "Descriptions of the Larvæ of N. American *Cleridae* (Col.)," with 12 plates and a few biological notes, several papers dealing with North American *Ichneumonidae*, and "Eocene Insect from the Rocky Mountains," with 5 plates.

Parts I. and II. of the *Trans. Ent. Soc. Lond.* for 1920 were issued in August. They contain "A Contribution to the Classification of the Coleopterous family *Endomychidae*," with one plate and numerous figures, by Gilbert J. Arrow; "*Pseudacraea eurytus* race *hobleyi*, its forms and its models, etc.," by G. D. H. Carpenter, with two coloured plates and a map; "Notes on the Biology of some Inquilines and Parasites in a nest of *Bombus derhamellus*, etc.," by H. Scott; "Notes on Fig-insects," by Jas. Waterston; "The Terminal Abdominal Structures of the Primitive Australian Termite, *Mastotermes darwinensis*," by G. C. Crampton, with a plate; "Records of Insect Migrations in Tropical America," by C. B. Williams; "An undescribed Lycaenid Butterfly from Cyprus, *Glaucopsyche paphos*," by Dr. T. A. Chapman, with a plate and several figures; "The Butterflies of Cyprus," by Hy. J. Turner; "The Geographical Factor in Mimicry," by Dr. T. A. Dixey, with one plate; "New Species of *Staphylinidae* from Singapore," by Malcolm Cameron; "A Contribution to our knowledge of the Stick-insect, *Carausius morosus*," by Geo. Talbot; and forty-eight pages of the Proceedings.

The Annual Report of the United States National Museum for the year ending June, 1919, just received, is very interesting in its detail and contains various illustrations of the Museum. There is an Obituary of the late Dr. Rathbun, who was Assistant Secretary in charge of the Museum for so many years. Then follow details of the work carried on by the Museum during the year in its various activities, finance, building, collections, publications, library, meetings, etc. Probably the most interesting matter is that contained in the Reports from several of the Departments, *viz.*, Anthropology, Biology, Geology, and Arts and Industries. These are followed by a list of recent acquisitions which include only a few additions to the Insect collections, but among these are the Hemiptera collected by the late G. W. Kirkaldy. An important feature of the work of the Museum is the share which it takes in many natural history expeditions to various parts of the world.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.

May 27th.—NEW MEMBER.—Mr. A. W. Richardson, of Southall, was elected a member.

EXHIBITION OF LIVING OBJECTS.—Mr. H. Main exhibited the Californian Hesperid *Epargyreus tityrus*, bred from a pupa sent by Miss Fountaine, also *Adscita statices*, larvæ of *Meloë* sp., and of *Galerucella lineola*, all from Eastbourne.

Mr. Blair, males and the very rare female of *Siphylurus armatus* (Ephem.), from Middlesex, *Odynerus pictus* (Hym.), and *Cassida equestris* with egg-clusters.

Mr. H. Moore, *Callophrys rubi*, from Westerham, and *Clytus arietis* from Bromley.

Mr. Dunster, larvæ of *Melitaëa aurinia* from Somerset.

Mr. Barnett, two vipers, one unusually dark-coloured, and a *Raphidia* sp.

Mr. Withycombe, *Donacia* sp., from Epping Forest, *Osmylus* sp., from Sevenoaks, and *Melolontha vulgaris*, from Richmond Park.

Mr. L. W. Newman, ab. *radiata-lutea* of *Abraxas grossulariata*, an almost black ab. *varleyata*, larvæ of *Calymnia pyralina* on elm, four forms of larvæ of *Saturnia carpini*, a *Dryas paphia* bred indoors, a *Calimorpha dominula*, varied larvæ of *Trichinura crataegi*, etc.

Mr. Sich, imagines of *Nepticula septembrella*, from Hindhead, and larvæ of *Salebria betulae*, from Richmond; also abnormal growth of flowers of the Fox-glove.

Reports of the Season were submitted.

June 10th.—SPECIAL EXHIBITION OF *C. TRAPEZINA*.—An exhibition of *Calymnia trapezina*, Messrs. R. Adkin, B. Adkin, Stanley Edwards, A. E. Tonge, Hy. J. Turner, etc., taking part. Mr. Turner read notes on the variation of the species, and gave a summary of the characteristics of the various named forms. Mr. R. Adkin showed a very fine example of the rare ab. *nigra*, and Mr. B. Adkin, a very dark-banded ab. *nigro-virgata*, Tutt, and a clear slate-coloured example.

OTHER EXHIBITS.—Mr. Withycombe, an immature *Ledra aurita* (Hem.), from oak.

Mr. Bunnett, living larvæ of *Ennomos illunaria*.

Mr. Main, larval tracks of *Phyllotoma aceris* (Tenth.), in sycamore leaves.

Mr. Step, the Yellow Balsam, *Impatiens parviflora*, from Wimbledon Park.

June 24th.—SPECIAL EXHIBITION OF *H. FURCATA*.—Exhibition and Discussion of *Hydriomena furcata*; Thun. (*elutata*). Messrs. Turner, Barnett, etc., exhibited series. The first-named showed a copy of Thunberg's "Dissertations," 1784, containing the original figure and description of the series, and read Notes on the Lines of Variation and pointed out the named forms. In Mr. Barnett's series was a very fine example of the *infusata* form.

CAPTURE OF *L. ERICHSONI* (COL.).—Mr. S. Ashby, specimens of the rare beetle *Lema erichsoni* taken by Mrs. Ashby and himself near Rye in April last.

EARLY STAGES OF *A. NITENS* (COL.) AND *L. AURITA* (HEM.).—Mr. Bunnett, series of the Rhyncophorous beetle *Attelabus nitens* (*curculionoides*) with leaves of oak rolled by the larvæ; and also larvæ and pupæ of *Ledra aurita* (Hemip.).

July 8th.—LARVA OF *P. LIVORNICA*.—Mr. Newman exhibited living larvæ of *Phryxus livornica* from ova laid by a female captured in Dorset in May, and made remarks on their habits.

VARIOUS EXHIBITS.—Mr. Withycombe, a larva on hawthorn of *Saturnia pyri* from a batch of ova from S. France; also the liver-wort *Marchantia polymorpha* and the rare Roman nettle *Urtica pilulifera*. Mr. Dunster, a series of *Melitaea aurinia* taken in Somerset in May, and of *Epinephle tithonus* showing additional spots on the fore-wings. Mr. Carr, series of *Brenthis euphrosyne* from Crockham Hill.

BRED *C. DAVIESANA* (HYM.) AND *C. GERMANICA* (COL.).—Mr. K. G. Blair, bred specimens of the bee *Colletes daviesana* from Shanklin with five species of inquilines and parasites; also living examples of *Cicindela germanica* bred from larvæ found May 4th.

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Duplicates.—*Phigalia pendaria*, melanæ and intermediate forms in great variety.

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Mr. Donisthorpe will still be glad to receive ants and Myrmecophiles from all parts of the British Isles, and to name any such for anyone who is kind enough to send them to him. He would however suggest that ants from any other parts of the world be sent to his colleague, Mr. W. C. Crawley, 29, Holland Park Road, W. 14. Mr. Crawley is specialising on the ants of the world, and it is a matter for congratulation that we should possess an Entomologist in this country whose whole attention should be concentrated on this branch of Entomology.

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m.: 1920, October 6th and 20th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E. 3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street, E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. (No Meetings in July or August.) Visitors welcomed. Hon. Sec., W. E. Gregg, 44, Belfast Road, N. 16.

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Gonepteryx cleopatra, L. Has it more than one brood per annum?

By J. A. SIMES, F.E.S.

Not very many years ago it was almost universally held by British lepidopterists that *Gonepteryx cleopatra*, L., produced only one brood per annum, and that the individuals of this brood, emerging as they did shortly after mid-summer, hibernated as imagines and reappeared in the following spring to pair and lay their eggs. Latterly, however, there has been a tendency to depart from this view; and we find in current literature definite allusions, by lepidopterists whose standing and reputation carry much weight, to the second and even the third brood of the species. Dr. Roger Verity, for example, has gone so far as to distinguish the second and third generations of *cleopatra* with separate names (*Ent. Rec.*, xxxi., p. 67); while more recently our Editorial Secretary, Mr. Turner, in his interesting paper on "The Butterflies of Cyprus" (*Trans. Ent. Soc. Lond.*, 1920, p. 133), shows an inclination to accept Dr. Verity's view, being impelled to that conclusion, apparently, by the facts recorded and brought to his notice by his Cyprian correspondents.

It was in 1903 that I first made the acquaintance of *G. cleopatra* in its native haunts; and in the years which have elapsed since, I have had abundant opportunities of studying its habits in many different localities. Holding at the outset the one-brood theory, the extraordinary freshness of the spring specimens almost induced me to accept the theory of a new emergence; but the attention which I have since paid to the species, and the careful observations which I have carried out over a number of years, have led me back to my original faith—a faith which I now hold more strongly than I ever did. I concur absolutely in the views of Röber (Seitz), to the effect that it is very doubtful whether any *Gonepteryx* ever produces more than one brood in the Palearctic region. To prove a negative is admittedly an impossible task; and all I can hope to do in support of my view is to place on record the observations and considerations which lead me to hold the one-brood theory.

It is I believe common ground that there is a fresh emergence of *G. cleopatra* about midsummer. The actual time of appearance of this fresh emergence varies considerably. I have met with this summer emergence at Brindisi as early as the first week in June; and I have known its appearance in the same locality to be deferred until nearly three weeks later. In the south of France this emergence takes place generally just about midsummer; and it was shortly after that time that I had an opportunity of studying *G. cleopatra* last summer at La Sainte Baume, Var, in company with Mr. G. T. Bethune-Baker and Mr. Hugh Main. Arriving on July 4th, I found *G. cleopatra* well out and abundant; its numbers increased very considerably for a few days until it could be described as extremely abundant in both sexes; but when I left La Sainte Baume, on July 13th, its numbers had fallen markedly, and the flight was evidently on the wane. Throughout these days of flight *G. cleopatra* had but one object in life, namely, to feed. Both sexes devoted themselves to this task with great assiduity, and rarely flew further than was necessary to carry them from one clump of lavender to the next. Once or twice I saw a ♂ try to flirt with a ♀; but his attentions were absolutely ignored and he soon desisted.

NOVEMBER, 1920.

No real courtship was ever noticed and never did any one of us see a pair *in copulâ*. What I *did* see was something quite different. From about July 7th onwards I observed at all times of the day—morning and afternoon alike—examples of both sexes wandering away from the flowers and seeking out dense brakes of *Cistus* and scrub oak. On several occasions I observed individuals actually enter these brakes in the brightest sunshine and take up a resting position underneath a leaf. I visited some of these brakes day after day and found the butterflies still there; and several times when tramping through the scrub in the day time I kicked up examples of *cleopatra*. I entertain no sort of doubt that these butterflies were in fact choosing and taking up their hibernating quarters, and that the rapidly declining numbers of the species were to be explained by withdrawal into hibernating quarters. The butterflies were all absolutely fresh and showed no signs of wear—as indeed they should not since they had not been on the wing for many days.

At Digne, which I visited from July 13th to 18th, *G. cleopatra* was comparatively rare and becoming rarer, only a few males being met with; and here I may perhaps say that in my experience the stragglers from this summer emergence which are reluctant to go into hibernation are always males. I have met with such belated individuals as late as the middle of August at Brindisi, Naples, Capri, Amalfi, and Sorrento; and I found one or two in the first week in August at Corfu. Once in October I took a male at Brindisi, flying over the *Cistus* scrub. I imagine this had either been disturbed by the herds of goats, or had been deceived into flight by the spring-like character of the late autumn.

The observations made at La Sainte Baume, which I have recorded above, only confirm earlier observations, which I had made at Brindisi, and seem to prove conclusively that the individuals of the summer emergence retire into hibernation, the bulk of them within a few days of emergence, and that withdrawal into winter quarters is complete by about the middle of August. The bulk of the individuals have retired by the end of July—most of them considerably earlier; and the few which stay on unduly are to be regarded, I should say, either as belated emergences of the summer flight, or as normally-emerged individuals in which the instinct of hibernation is faulty. (Similar "faults" are not unknown in other hibernating species).

Now in the South of Europe there occurs almost regularly a period in the late autumn when, as the result of rains followed by a spell of tempered sunshine, the conditions approximate very closely to those of spring. This corresponds, I take it, to the "Indian summer" of American and other authors. It is marked by a recrudescence of growth and flowering in many low plants, especially in the case of those which are of early spring-flowering habits; and there is also a marked recrudescence of song on the part of birds which have been long silent. It would not be surprising if in the case of butterflies, which require spring-like conditions to call them forth from hibernation, a certain small proportion of the whole should have the hibernating instinct so imperfectly developed as to be lured out by the counterfeit spring. I suggest that this is the explanation of the October examples referred to by Mr. Turner in his paper referred to above. In the normal course, had they not been deceived by fair appearances, I suggest

that these butterflies would, with the rest of their relatives, have stayed in hibernation until the following February or March, when they would have come forth to feed and to pair, and to oviposit, until by the middle or end of May they completed the span of their existence. Their eggs, laid in February, March, or April, would mark the first stage of the succeeding summer—and in my view the only—emergence, which in Cyprus, apparently, is on the wing as early as the end of May. This, at any rate, is how I should account for Mr. Turner's facts.

The condition of the food plant during the summer months has an important bearing on the question of the single-broodedness or otherwise of *G. cleopatra*. In most of the areas where I have worked the food plant is *Rhamnus alaternus*—an evergreen. Its period of annual growth is short, and in my experience ceases as soon as the sun is powerful enough to burn up the countryside, say at latest by the end of June. After that the leaves become hard and dry; and I should say they would be utterly impracticable as food for a Pierid larva until the next period of growth supervened.

So far as I can gather, the lepidopterists who hold that *G. cleopatra* produces two or three broods per annum, base their views on the time of appearance of the butterfly, and on that only. In the case of such a genus as *Gonepteryx*, with its known habits of hibernation, I suggest that "time of appearance" is not of itself a sufficiently sound basis on which to form a conclusion. What we want is evidence of the copulation of butterflies of the summer emergence during say late June or July, of the deposition of eggs by such butterflies, of the discovery of such eggs, or of larvæ, on the food plant in July or August, or of pupæ in the late summer or autumn. In other words we want facts; we want proof that anything beyond one brood is, or ever has been, produced. It may be that when we are certified of the facts some new names will be useful to connote the biological actualities: but I suggest that until such actualities are established the conferring of names on unidentifiable insects can only serve to hamper the progress of students of the living insect, to the detriment of our science.

Coleoptera at Freckenham and Barton Mills again.

By H. DONISTHORPE, F.Z.S., F.E.S.

Having made several successful visits to Freckenham and Barton Mills [vide *Ent. Record* 30 28-29 (1918); *Ent. Mo. Mag.* 54 55-56 (1918); *Ent. Record*, 32 153 (1920)] previously, I determined to go again, and accordingly I spent some five days, from September 29th last, collecting in that district.

A number of Lycoperdons were collected from both localities and brought home. These I have put on damp sand in large glass bowls, tied over with muslin, and hope to breed out some of the "puff-ball" species later on.

At Freckenham several specimens of *Coenocara bovistae* were taken crawling on the outside of large puff-balls. *Psylliodes chrysocephala* occurred in vast numbers by sweeping a field of turnips in flower, but unfortunately neither of the two well-marked aberrations were found. In the sand-pits mentioned by me (*antea* p. 153) before, and where so many species usually found at the sea-side turned up, *Broscus cephalotes* was present, adding to the number of such species.

Xantholinus tricolor, *Lathrobium multipunctum*, *Agathidium marginatum*, and *Adimonia tanacetii* in great abundance, were found in the sand-pits; also a specimen of *Chrysomela distinguenda*. The best find however was a nice series of *Chrysomela marginata*; this rare species, which is a new record for Suffolk, was taken in the different sand-pits and also in rabbit-holes by careful and diligent searching. Fowler gives the British distribution as Southend; Pegwell Bay; Swansea; Barmouth; Northumberland; Cheviots, etc.; Scotland, Edinburgh, Knockleith, Braemar, etc. In the supplement we add—Devil's Dyke, Brighton; and Cleethorpes, Lincs.

At Barton Mills *Hippodamia variegata* was as abundant on small fir trees as it was in 1918, and I examined a great number of specimens, to see if I could add more of the known aberrations to our list. The following forms occurred:—

- (1) Six spots on each elytron and the scutellary spot present; this appears to be the type form.
- (2) One spot on each elytron and scutellary spot=ab. *inhonesta*, Weise.
- (3) Two spots on each elytron and scutellary spot=ab. *quinquemaculata*, F.
- (4) Three spots on each elytron and scutellary spot=ab. *constellata*, Laich.
- (5) Four spots on each elytron and scutellary spot=ab. *carpini*, Fourc.
- (6) Five spots on each elytron and scutellary spot=ab. *neglecta*, Weise.
- (7) Fourth and fifth spots confluent=ab. *ditylotus*, Donisthorpe, *Ent. Rec.* 30 29 (1918).

Of these seven forms nos. (2) and (6) have not been recorded from Britain before, as far as I am aware. It is perhaps as well to mention that I have not looked up the original descriptions; these being the interpretations given by Ganglbauer. It is probable that they will require revision when this has been done.

A nice series of *Anisotoma cinnamomea*, including some very well developed ♂♂, was swept off long grass in rides between fir trees. About three o'clock in the afternoon, the sky clouded over, and a fine drizzle came on, when the first specimen was swept, and the last was taken about five o'clock. Morley only records this fine species from Suffolk on the authority of Curtis.

Other species swept at the same time were—a very fine really jet black example of *Rhizobius litura*, only the tarsi and extreme apex of the elytra being lighter; a dark form of *Micraspis 22-punctata*; *Phalacrus substriatus*; *Olibrus corticalis*; and *Apion rubens*, no *Rumex* being present; etc. *Homalota divisa*, *H. parva*, and *H. laevana* were shaken out of a dead hedge-hog.

Numerous other common species were taken or noted, which it is unnecessary to mention here.

The Rhopalocera of the Bangalore District, India.

By T. H. L. GROSVENOR.

Having been asked by the Editor of the *Entomologist's Record* to give an account of the Lepidoptera met with during the course of my wanderings since August, 1914, I will do my best to comply, but am afraid that these notes will leave a lot to be desired, as army life does not lend itself to Entomology. Of course I know the old saying that

if work interferes with entomology give up the work, and although quite willing to carry out this precept, each battalion has a treasured possession in the person of the Sergeant Major, who prefers a long parade state to a long series.

In many ways I was fortunate, especially in my Colonel, who readily granted many little privileges, which enabled me to obtain species that without his goodwill I should never have taken. In other ways I was unfortunate, as when I had made arrangements to apply for leave to go on long journeys, something always occurred to prevent my going; for instance, in 1917 I was going to Lahoul to try for *Parnassius* and other Palaearctics that occur in great number in that remote region. The Mahsuds started raiding on the Dera Jat frontier, and the Government deciding on punitive measures, my battalion was ordered to Waziristan.

In 1919, thinking everything quiet, I decided to apply for leave to go to Northern Sikkim to see if *Armandia lidderdalii* and ♀ *Teinopalpus imperialis* were to be found, but the Amritsar riots, and Afghan war, called me elsewhere; yet as I am not writing an account of frontier warfare I will return to August, 1914, when I joined the London Cyclists, and in accordance with the scheme of coast defence, we were ordered to the south coast; after a few months here we were moved to the Norfolk coast, when one day orders were issued to hand in our cycles, and we were hurriedly moved to Chisleton Camp *en route* for East Africa, but after being there for several weeks these orders were cancelled, and we were sent to Devonport and shipped on board the H.M.T.S. "Ceramic" for an unknown destination, but the days at sea passed without our landing at any of the theatres of war, and we reached Port Said, where two visitors came on board, *viz.*, a hoopoe and our old friend *Pyrameis cardui*. Finally on February 28th, 1916, we landed at Bombay, and immediately entrained to Bangalore.

To one landing in India for the first time, the journey through the Western Ghâts is very deceptive, as one immediately fancies this very beautiful range of hills to be typical of India, but one soon learns that this is the exception. I did not get an opportunity of collecting in this part of the Peninsula, and judging from the varied and tropical vegetation, it should be a most productive collecting ground. Butterflies were swarming along the railway banks, but beyond a few common species, I could not identify them, which was perhaps as well for my peace of mind. After three days in the train we arrived at Bangalore, but still I had to restrain my enthusiasm, as every regiment arriving in the country has to be in quarantine for a period of 14 days, at the expiration of this time I started entomology whenever I could manage to obtain any spare time. Thursdays were anxiously looked forward to as this day is a holiday for all troops in India, and the following notes show the results obtained.

Menelaides (Papilio) hector.—Abundant everywhere, especially in a small sandal wood plantation at the back of the Hebbal rifle ranges, apparently continuously brooded, as from March to December they were always to be found in every possible condition. This was the only *Papilio* I found of which both sexes were commonly taken. For several weeks I despaired of ever being able to take this striking butterfly, but finally I found they could be taken in any number between the hours of 4 to 6 p.m., when they cease flying high and

settle on a small green daisy-like flower; they may then be taken without a net; at the approach of dusk they settle for the night usually in small colonies of 5 or 6, and apparently return to the same tree each evening. I watched one for over a fortnight, having selected it for observation on account of a crippled hindwing, so that there was no chance of mistaking it. One afternoon I saw this insect at the farther side of the plantation at least a mile away, but it came back to its usual tree for the night; on several occasions I found the pupa attached to twigs or small branches of various bushes, but failed to find the larva.

Menelaides (Papilio) aristolochiae.—Not nearly so abundant in the Bangalore district as *P. hector*, but in the Central Provinces it is in great numbers, and there replaces *P. hector*. Whilst travelling north I saw it in hundreds flying round the trees, preparatory to settling for the night. The larvæ were fairly plentiful round Bangalore feeding on a species of *Aristolochia*, but I only managed to breed a few, the majority being ichneumonised, which perhaps accounts for its being so uncommon in this district.

Papilio demoleus.—Very abundant but very fast on the wing and difficult to obtain in good condition, but as the larvæ and pupæ may be found in numbers on orange and allied species of shrubs, and are easily reared in captivity, one need not worry about the imagines. This butterfly is gregarious at night, and when their headquarters are found they will be seen by dozens, usually 3 or 4 sitting on a grass culm. They always frequent the same spot at night and apparently come from long distances to a selected locality, which will only extend for a few yards; outside this area not a single specimen will be seen, until one comes to the next roosting ground perhaps 3 or 4 miles away. I only found four of these spots in the Bangalore district in a radius of about 10 miles, it seems impossible to assign a reason for this excessive local tendency at night, as in the course of a ramble hundreds of similar spots will be noticed. Of course, this nightly gathering is general among the *Papilios*, but in no other species is it carried to such extremes.

Iliades (Papilio) polymnestor.—Very scarce; I only managed to take a single ♂, and only saw three others; it flies very high and swiftly.

Laertias (Papilio) polytes.—Perhaps the most general and abundant species of the Indian *Papilios*. The male is to be seen everywhere, but the interesting polymorphic female is very difficult to find, as it seldom if ever flies in the open, and has to be searched for in dense bushes, and when found is generally torn to rags. By hard work I was rewarded by three forms in perfect condition.

- (1) Resembling the ♂ but considerably larger.
- (2) Mimicking *P. hector*.
- (3) Mimicking *P. aristolochiae*.

It is difficult to see what advantage is gained by Mimicry, as the habits of *polytes*, *hector* and *aristolochiae* are entirely different, and one never has the slightest doubt as to which species one sees, although so closely resembling one another in colour and markings. It certainly does not protect *polytes*, as I have on several occasions seen the King Crow (*Dicrurus ater*) not only attack, but eat it. The prevailing form is that resembling *aristolochiae*.

Pathysa (Papilio) nomius.—Very scarce. I only saw a single male which I took at a puddle of dirty water.

Zetites (Papilio) agameannon.—Not very abundant, and difficult to obtain, as it flies very high and when feeding chooses the top blooms of the highest Lantana bushes.

This brings to an end the list of Papilios that I obtained in the Bangalore district, I of course took several other species in different parts of India, but as Kipling says "that is another story."

Nychitona (Leptosia) xiphia.—I only saw a single male of this delicate little insect, although I made a careful search in the district where I obtained my only specimen.

Delias eucharis. Generally scarce, only 2 or 3 seen in June when it was very wasted.

Anaphæis mesentina.—By far the most abundant butterfly in India. The larvæ are to be found by thousands on a small thorny bush of which I do not know the name. I think my record for numbers was a branch slightly under 18 inches in length with five side shoots each slightly under 6 inches, which had 64 pupæ attached to it. This was in the Punjab, where generally it is more abundant than in the South. In 1918 I collected many thousands of these pupæ and bred a most variable series, the females especially ranging in colour on the under-side of the secondaries from a deep orange to buff and creamy white; but I never had the pleasure of setting this series, as the worst enemy of the entomologist in India attacked the three large cigar boxes in which they were, and in less than a week they had cleared every butterfly out. This enemy is a very small almost transparent ant, which believes in the German method of attack in mass formation with thousands in reserve, and will absolutely ruin a box of insects in a few hours. The method I used finally to keep these pests away was to get a tray of paraffin, stand a tin in the centre of this and then place my box of butterflies on the top. By this method I was able to keep the ants away and to a lesser degree the small beetles that are also very destructive. This species has 3 or 4 broods per annum, but the larvæ are never so abundant as in May. I could not find any trace of seasonal dimorphism, the wet season producing a form that could be readily matched in the dry season.

Pieris canidia.—Local and scarce in the Bangalore district, by no means a well marked form and showing little variation.

Ixias pyrene and *I. marianne*.—Both common and generally distributed in bushy country; difficult to net owing to their habits of flying through thorny bushes.

Catopsilia crocale, *C. pyranthe* and *C. florella*.—All three very abundant and much given to migration. In June, 1916, I noticed a migration which lasted three days and was composed mainly of *C. pyranthe* with smaller numbers of the other *Catopsilia* species. They were all travelling from east to west across an area north and south of not more than $1\frac{1}{2}$ miles; outside this belt very few were to be seen, during these three days many hundreds of thousands must have passed. So conspicuous, even to non-entomologists was the continuous passing of these butterflies that nearly every man in the camp passed some remark about them. There was a slight breeze blowing from the S.W. so that they were travelling practically against the wind. They did not stop at any blooms or even puddles of dirty

water, which in the ordinary course of events are a certain attraction, and it is a common sight to see dozens of *Catopsilia*, especially *C. crocale*, and I am not exaggerating when I say, scores of *Terias* swarming over a patch of wet mud. At the end of three days this migration ceased, and the *Catopsilias* behaved in a normal fashion, and did not seem to be increased or decreased in numbers. During the migration the hours of flight were from sunrise to sunset, and during these hours the kites and mynahs levied very heavy toll, while after dusk the mongooses carried on the work so that the ground was covered with wings.

Terias libythea, *T. hecabe* and *T. sari*.—Were generally abundant, but I will not say anything about these, beyond that I took a long series, for so far they have beaten me in the matter of identification, as they vary to a considerable extent, especially *T. hecabe*, so that one species overlaps the other, and until I get time to examine the genitalia, I should not like to give a definite opinion as to which is which. The other species, *T. laeta*, was rare, but is easily identified by the different shape of the primaries.

Colotis amata.—Generally scarce. I only saw about half-a-dozen, and these were restricted to a compound with a piece of rough ground.

Colotis eucharis.—This beautiful little insect was abundant on the plains and was very conspicuous on the wing, its favourite localities being barren country with a few thin blades of grass. It is apparently single brooded but is on the wing for a considerable period, *viz.*, from early July to middle of September. During this period they may be found in every possible condition.

Hobomoia glaucippe race *australis*.—Generally common flying swiftly round the tops of mango trees, but I was only able to secure a single male.

Pareronia hippia.—A single male only seen flying in a small wood.

Cyaniris pampa.—A few males only taken in a small wood. Generally, with a few exceptions, I found the *Lycenids* scarce in the Bangalore district. I believe them to be more abundant in the hills round, but as I did not get an opportunity to go more than 10 miles from barracks, I was not able to sample that country, and could only look on the distant hills with envy.

Zizera maha and *Z. gaika*.—Both species fairly abundant on the surrounding plains.

Azanius ubaldus and *A. uranus*.—Fairly plentiful in the district, although I spent considerable time working the *Lycenids* I could not find any variation, compared with that in the British species.

Talicauda nyseus.—Scarce. I only saw 3 or 4 males.

Lampides bochus.—This beautiful little butterfly, which rivals the *Morphos* in colour if not in size, was very abundant in July flying round acacia bloom, but difficult to obtain in good condition.

Lampides celeno.—Abundant on any small flowers.

Catochrysops strabo and *C. cnejus*.—Both abundant.

Tarucus theophrastus?—Very abundant in restricted areas flying round and settling on *Zisiphus jubata*; it was most abundant on the parade ground of Baird Barracks. I am very doubtful as to the identity of this insect, as in northern India I found another butterfly similar in appearance but averaging at least 2 mm. larger in expanse. Also the coloration of the male of the latter is similar to that of the

British *Polyommatus icarus*, and the markings on the underside blackish, whereas the Bangalore males are lilac with underside markings reddish-brown. The females from both north and south are somewhat similar, but the northern race is considerably larger. I have a fairly long series of both, and after labelling I mixed both races indiscriminately and then sorted them without reference to the data, and found I had not the slightest difficulty in differentiating the two races; this I did without hesitation and without a single error. I have not yet examined the genitalia, and if they do not prove to be distinct species, they are at least well marked races, and more worthy of a name than some of the local races, which have acquired them for some reason best known to the person who named them. I have several of both of these races to spare and if any entomologist is interested in the genus *Tarucus* I shall be pleased to hand them over.

Castalius rosimon.—Very local and not common. I only found about a dozen in a small sandalwood plantation at the back of Hebal ranges.

Polyommatus boeticus.—Abundant everywhere. This was perhaps the most plentiful *Lycanid*.

Curetis thetis.—Abundant in wooded country. Although most conspicuous on the wing, with the bright copper colour shining in the sun, when settled on a leaf it becomes almost invisible, the reflected glare of the sun on the leaves harmonising with the silvery white underside.

Iraota mæcenæ.—I never saw this insect on the wing; the two males that I have were taken, one larva and one pupa, on a trunk of a very large banyan tree.

Badamia exclamatoris.—Very abundant on flowers, especially on acacia blooms. *Hesperiidae* generally were very scarce and I regret to say the few I have taken are not yet identified.

Danaiida plexippus.—Generally distributed, but tending to be gregarious; when one came across one others would be certain to be found in the near neighbourhood. It was not found in the open like *D. chrysippus*, but was generally found in woods or bushy country. At night they collected together with *D. linniæ*, *Euploea core*, and *E. coreta*, and these four species could be found in hundreds in low branches of trees.

Danaiida chrysippus.—Very abundant everywhere from S. India to Afghanistan and Waziristan, and is practically the only butterfly I observed in the latter country. It is apparently continuously brooded, as imagines can be seen from Jan. 1st. to Dec. 31st., also ova, larvæ, and pupæ can always be found together, whenever one takes the trouble to look for them.

Danaiida linniæ.—Abundant in wooded country and like *chrysippus* apparently continuously brooded.

Euploea core.—Abundant in woods all through India.

Euploea coreta.—Apparently abundant in the Bangalore district, but unfortunately I did not recognise the fact that I had taken a distinct species until my return to England, but as at least half the *Euploea*s taken in this district are this species, it must be equally common.

Mycalesis perseus.—Common in the ricefields.

Melanitis ismene.—Abundant in the ricefields; I could not distinguish any difference between the wet and dry season forms, for

one thing it is difficult to take two alike, and the alleged dry season form occurs commonly in the wet season and *vice versa*.

Charaxes fabius.—Apparently of rare occurrence, I only observed a single specimen.

Eulepis athamas.—Fairly common, but very local, I only found one small district where it could be found, and generally congregated on a single Lantana bush, although this plant was growing everywhere.

Euthalia garuda.—Generally common, it was particularly fond of sitting on wet mud at the edge of a tank or stream.

Athyma perius.—Not common, I only saw a few odd specimens at Hebal.

Cyrestis thyodamus.—A single specimen seen.

Junonia iphita, *J. lemonias*, *J. orithya*, *J. hierta*, and *J. almana*.—All common and generally distributed; very fond of sunning themselves on hot stones.

Pyrameis cardui.—Odd examples everywhere.

Hypolimnias bolina.—Very abundant especially in September.

Hypolimnias misippus.—Abundant. The female, although closely resembling *chrysippus*, cannot be mistaken on the wing, owing to the latter flying in the open, *misippus* female never leaves the vicinity of bushes and is given to flying through them. The female is not often seen although the male can be seen in hundreds.

Atella phalantha.—Very abundant everywhere from June to September.

Telchinia violae.—Very abundant in moist woods. I was fortunate in taking a rather nice aberration of this species, the spots of which are joined together forming a black discal blotch.

This, I think, completes the list of butterflies taken in Bangalore, a total of 60 species, I do not pretend that this by any means exhausts the resources of the district, as my time was limited and facilities for visiting some of the more promising districts were wanting. I feel confident that if some of the hilly and jungle districts were visited this list would seem a very meagre one.

SCIENTIFIC NOTES AND OBSERVATIONS.

LIFE HISTORY OF *GASTROIDEA VIRIDULA*, DE. G.—1920. May 29th. —Walked to Challacombe (1570 feet above sea level) about 6 miles south of Lynton (N. Devon). Hundreds of *G. viridula* ♂ and ♀ on leaves of *Rumex obtusifolius* (Common Dock) and on underside of leaves thousands of eggs.

Eggs.—Are 1mm. long × .5mm. wide, bright yellow in colour and very conspicuous. Laid in irregular clusters in two or three places on underside of leaf: sometimes as few as 15 and as many as 60 in a bunch.

May 31st.—Small dark spot appeared at one end of the egg.

June 1st.—Dark spots appeared all over and hairs appeared to be growing through shell of egg.

June 2nd.—Larva emerged: ate portion of egg-shell.

LARVÆ.—June 2nd, 1st day.—Larvæ are grey with black heads.

June 3rd, 2nd day.—Larvæ are black all over, with 6 4-jointed legs and 2 knobs for antennæ. Commenced to feed at night, biting a round hole on underside of leaf.

June 4th, 3rd day.—First moult. Larvæ now 2mm. long. Leaf eaten right through. They can erect and propel themselves by means of a tubercle at base of last segment.

June 11th.—They are now 4 mm. long and thicker in body.

June 16th.—They are now 7 mm. long and drop to ground to pupate.

PUPÆ.—I was curious to find out whether the larvæ would pupate on the leaf like the 2-spot Ladybird (*Adalia bipunctata*), but not one could I find—all had dropped to earth.

July 6th.—Three imagines emerged.

July 7th.—Five imagines emerged.

July 9th.—Dug up and sifted out all the earth, but only one pupa to be found. This one had no outer-casing, but the larva had made a smooth circular cell—pupa is bright yellow in colour; wings or wing cases (undeveloped as yet) plainly to be seen, also antennæ. Pupa 6 mm. long. Several bristly hairs on head and abdomen.

July 9th.—Six or seven imagines in breeding cage.

IMAGINES.—The perfect insect is so well known that it needs no description. *Gastroidea* is no doubt a good name for the insect, but it does not become "pot-bellied" until after copulation.

I hope next year to work out the Life-history of *Chrysomela fastuosa*. The larva feeds on the hemp nettle and is found at the same place.—R. BECK, Barnstaple, 9th Oct., 1920.

NOTES ON COLLECTING, Etc.

A BREEDING RESULT.—Referring to my previous letter under this heading (p. 100), the second alternative suggested by a correspondent in the October number (p. 192), eventually proved to be the solution of the matter.

That the *A. alni* pupa must be somewhere in the piece of cork, naturally occurred to my mind at the time, but as there appeared upon inspection to be no apparent aperture or means of exit, the idea was dismissed.

A week or two later, happening again to come across the piece of cork, I started to cut carefully into it at what appeared to be a perfectly natural crack or fissure in the cork, and some distance in I came to the empty pupa case in a comparatively large cavity, hollowed out to the exact size and shape of the pupa, the empty case of which filled it perfectly.

That it was possible for the imago to emerge through the extraordinarily small aperture in the face of the cork, and for the larva to have bored out the shaped cavity inside, without leaving a larger and more apparent opening, is certainly wonderful.—R. BARNARD CRUICKSHANK, Alverstoke.

NOTES ON COLLECTING IN ITALY (1918 AND 1919).—(Continued from page 100).—Appalingly hot weather throughout June, 1919, in the Turin District, in addition to my military duties, made collecting sometimes a work of difficulty, however, the following list of species captured by me in the district will perhaps be interesting. To economise space I use the following abbreviations, viz., R.=Rivoli, a short and pleasant trip by electric train from the Stazione Porta Susa; T.=the

immediate environs of Turin including the Valentino Gardens, along the River Po; S.=Sassi; St.=Stupinigi Wood.

RHOPALOCERA.—*Papilio machaon*, T., St., *Aporia crataegi*, R., *Pieris rapae*, St., *P. napi*, R., St., *Leptosia sinapis*, R., St., S., *Colias hyale*, R., *Gonepteryx rhamni*, R., St., S., *Dryas paphia*, St., S., *Argynnis aglaia*, St., *A. cydippe* (*adippe*), St., *A. niobe*, St., *Issoria lathonia*, R., St., *Brenthis selene*, St., *B. dia*, R., St., S., *Melitaea didyma*, R., *M. athalia*, R., St., S., *Vanessa io*, St., *Eugonia polychlorus*, R., St., *Polygonia c-album*, R., St., S., *Apatura ilia* ab. *eos*, St., *Limenitis camilla*, R., *L. sibilla*, St., *Pararge aegeria*, R., S., *P. megera*, S., *P. achine*, St., *Enodia dryas*, St., *Epinephele jurtina*, R., St., S., *Aphantopus hyperantus*, St., *Coenonympha arcania*, R., *C. pamphilus*, R., *C. doris*, St., *Melanargia galathea* (var. *procida*), St., R., *Rumiccia phlaeas*, St., S., *Cupido minima*, R., *C. sebrus*, R., St., *Celastrina argiolus*, S., *Polyommatus semiarctus* (*acis*), R., *Agriades thetis* (*bellargus*), R., *P. icarus* (*alexis*), R., *Callophrys rubi*, R., *Chattendenia w-album*, St., *Nordmannia ilicis*, St., *Augiades sylvanus*, St., *Adopaea flava*, St., S.

I wish here to correct the mis-statement that I made previously in this magazine, pages 170, 172, and onwards of vol. 31, that I captured *Strymon pruni* at Arquata Scrivia.

I never captured *S. pruni*, nor saw it during the whole of my two years' collecting in Northern Italy—with apologies to your readers, I quite mistook the species owing to the absence of English illustrations at the time.

HETEROCERA.—*Amorpha populi*, T., *Macroglossa stellatarum*, T., *Zygæna filipendulae*, S., *Z. carniolica*, S., *Syntomis phegea*, St., S., *Pterostoma palpina*, T., *Apatela aceris*, T., *Cucullia verbasci*, T., *Agrophila trabealis*, T., *Grammodes algira*, T., *Angerona prunaria*, T., *Toxocampa lusoria*, T.

During June I recognised forty-eight species of plants in blossom in Turin and at Rivoli.

COLEOPTERA.—*Copris lunaris*, R., *Trichodes apiarius*, R., *Chrysomela menthastri*, R., *Olythra laeviuscula*, R., *Leptura hastata*, St., *Cantharis rufa*, St., *Polyphylla fullo*, T., *Purpuricenus koehleri*, S.

ODONATA.—*Libellula depressa*, T., St., *Cordulegaster annulatus*, St., *Gomphus vulgatissimus*, St., *Calopteryx virgo*, St., *C. splendens*, St.

HYMENOPTERA.—*Ammophila heydeni*, St., *Bombus lapidarius*, R., *Anthophora acervorum*, R.

RHYNCHOTA.—*Kedrus personatus*, R., *Graphosoma lineata*, S.

DIPTERA.—*Asilus dasipogon*, R., *Tipula gigantea*, R., *Volucella inflata*, St., *Myiatropa florea*, St.

ORTHOPTERA.—*Locusta viridissima*, T., *Forficula auricularia*, St. (*To be continued.*)—LIEUT. E. B. ASHEY, F.E.S., 36, Bulstrode Road, Hounslow.

ROSALIA ALPINA AT CHICHESTER.—A fine specimen of this handsome Longicorn beetle was taken in a garden not far from my home. It is a male and was identified for me by my friend Mr. Guernonprez, of Bognor, who gave me the following particulars:—"As a larva it is said to live on the decayed wood of copper beech trees, and is found in South Sweden, through Germany and France to Italy, Hungary and Turkey."—JOSEPH ANDERSON, Chichester.

LYTTA VESICATORIA AT CHICHESTER.—Several specimens of *Lytta vesicatoria* were noticed here during July. One of them in my possession deposited a quantity of eggs, which I sent to be reared by Mr. Guernonprez of Bognor.—LD.

SIREX GIGAS AT CHICHESTER.—One of these Giant Sawflies was taken in our neighbour's (the Misses Jarman) conservatory on August 13th last.—LD.

A RAMBLE IN A MANSFIELD WOOD.—October 7th being a splendid day, the sun shining with great force, a regular treat at this time of the year, I paid a visit to my favourite wood in quest of two species of Lepidoptera, *Oporabia dilutata* and *Hibernia defoliaria*, which generally occur in plenty with some good local forms, but I only took one of the latter and two of the former. When I visited the same wood in spring there were thousands of young larvæ of the common species found in woods; I did not trouble to collect any then, intending to get some later on, when nearer full grown to save trouble of feeding up. But on paying a visit later I did not get above a dozen larvæ, and most of these were stung. There had been a fortnight's bad weather and very heavy rain storms, which had no doubt washed the young larvæ off their food plants. *Cheimatophila hyemana* was common, but late. I had not got very far into the wood when my attention was taken up by the mad flight of two moths round the top of a birch tree, and I saw at once that they were specimens of *Brephos parthenias*. They reminded me of the antics of moths flying around gas and electric lights at night. They were out of reach of the net, but suddenly one made a nose dive to earth similar to an aeroplane, did not settle but again mounted up and flew around the tree. Shortly after they both went away over the tops of the trees. One came down just out of reach but near enough to make sure that it was *B. parthenias*. The species is common in the wood in March and April, but in my sixty years of collecting this is the only occasion on which I have seen the species in Autumn.—WILLIAM DAWS, 39, Wood Street, Mansfield, Notts.

CURRENT NOTES AND SHORT NOTICES.

The Annual Exhibition of Varieties promoted by the South London Entomological Society is usually a feature of the winter session and there has been for many years a large gathering of followers of the "net and pin." The Meeting will take place this year on the evening of November 25th at 7 o'clock, and already promises of varied exhibits have been made. It is understood that the genus *Peronea* will be again to the fore, there will be a collection of butterflies made this year in the Pyrenees shown, a considerable number of forms of European species and species closely allied from the Asiatic portion of the Palearctic Region will be on view, some interesting items in the life-histories of insects found in the S. of France this year, and numerous breeding results have also been promised. Visitors and friends are cordially invited to be present and the Council would be pleased to have exhibits from those who attend.

The Mosquito Investigation Committee of the South-Eastern Union of Scientific Societies have just issued, with the assistance of a

grant from the Ministry of Health, a comprehensive circular containing an account of the British mosquito *Anopheles plumbeus* so far as known, particularly the further details of its life-history and of its distribution in the British Island, which it is desirably should be more thoroughly investigated and known. There are figures of the structure of the species as an aid to its identification and of the peculiar habitat in which it breeds. This last is in the rot-holes in the trees, either in the trunks themselves or in the water holes often found among the exposed roots at the base of large trees such as beech, elm, sycamore. Entomologists are earnestly requested to get all the facts they can and report to the Secretary of the Committee, the Rev. T. W. Oswald-Hicks, B.A., "Lesware," Linden Road, London, N. 15, who will send copies of the circular and any further particulars helpers may require.

The Entomological Society of London is increasing its number of Fellows by leaps and bounds. At a recent meeting no fewer than twenty-one were elected. These came from all over the world. In fact the prestige of the Society is now so great that all who wish to keep apace with what advance is being made in entomological science cannot afford to stand aloof.

Coupled with the rapid increase in its membership is the fact that at last the Society has obtained a permanent home. A large freehold residence near the S. Kensington Museum (Nat. Hist.) has been purchased and in due course the Society will enter into these new premises. An initial amount of £10,000 was asked for to be made up by donations and loans, and a greater part of this has already come in, sufficient, we understand, to more than pay the purchase price. However, a very considerable outlay will be needed before the Society can hold its meetings there, and to defray the expenses of the necessary fitments it is hoped that every Fellow will forward his contribution at the earliest possible.

In their new quarters the Society will have ample room to make the Library much more usable than it is at present with the congested book-cases at Chandos St. Since the Library is a very extensive one it is necessary that it should be disposed in such a way as to render it available for research with the least amount of trouble. This is all the more necessary as a portion of the premises, not at present required for the purposes of the Entomological Society, will be occupied by the recently formed Imperial Bureau of Economic Entomology, whose staff will thus have a very considerable amount of literature close at hand for any urgent matters of research.

We hear that the Society is the only Entomological body in the world with its own freehold premises. This has long been a desire of some of the older Fellows to whom must be a great gratification to see their wishes fulfilled. The thanks of all the Fellows are due to the persistent efforts of the present Council and particularly to its Hon. Treasurer, Mr. W. G. Sheldon, whose marshalling of the finances of the Society has been so successful as to bring about the realisation of the aim, which a few years ago was thought to be quite impossible.

In the *Canadian Entomologist* for August is an article on a matter which is always a subject of divergent views, entitled "Remarks on the Basic Plan of the Terminal Abdominal Structures of the Males of Winged Insects," and illustrated by a series of explanatory diagrams.

The *Rev. Mens. Namur.*, July to September, contains some impor-

tant articles, one on the variation shown in *Polyplocia ridens* and with its various named forms, another discussing at length the *adrasta* forms of *Pararge maera*, and another on the genus *Acronieta* dealing with the three species most closely resembling each other *A. psi*, *A. cuspis* and *A. tridens*.

The *Report and Trans. of the Cardiff Nat. Socy.* for 1918 has recently come to hand. It contains the usual annual local records and the reports of the doings of the various sections, together with three original papers read during the year, of which one is entomological. "The Diptera of Glamorgan," by Colonel J. W. Yerbury, R.A., F.Z.S., F.E.S., is a most important memoir of 32 pages, mainly the results of the author's personal efforts, to which a few records have been added by Mr. H. W. Andrews. Dates and localities are given and in many cases short notes are added. About 650 species are included.

We have received a long and interesting communication from Major P. P. Graves, F.E.S., giving an account of his recent collecting in the Eastern area with many interesting remarks on Smyrna and Brussa. Dr. Verity is also sending an article dealing with the common Zygaenid *Z. filipendulae* and its various forms and local races. Signor Orazio Querci has promised to give us a note on the collecting done by his wife and daughter during the past season in Calabria and at Garfagnana. In the December number we hope to give the final portion of the supplement which was commenced many months ago on Hubner's *Verzeichniss*.

Can anyone help our colleague the Rev. C. R. N. Burrows with Psychides? At present he is particularly in want of specimens of *Lufia lapidella*. We were recently looking over his collection of imagines, cases and microscopical mounts and find that there are still a number of desiderata. It may be mentioned that the whole of the specimens will eventually be placed in the cabinets of the British Museum. Will readers on the continent please note.

The *Transactions of the London Natural History Society* (late City and North London) for 1919 has recently been published. It is a modest volume, as all annuals have to be now, nevertheless it is a useful record of the year's exhibits, reports of the various sections, abstracts of papers read, and several papers are printed in full. One of the latter was an extremely interesting summary of what is known on the "Wing Colour in Butterflies and Moths." This was read as an Annual Address by the President, Dr. Cockayne, F.E.S. Another was "Parallelism in Variation in Butterflies," by H. B. Williams, LL.B., F.E.S. Among the abstracts of papers are paragraphs dealing with "The Oak and its Insects," by Messrs. Bishop, Bowman, and Hall. There are several obituaries.

SOCIETIES.

THE ENTOMOLOGICAL SOCIETY OF LONDON.

April 7th, 1920.—DEATH OF A FELLOW.—The death was announced of the Rev. Stephen Henry Gorham, the oldest Fellow of the Society, who joined it as far back as 1855.

ELECTION OF FELLOWS.—Mr. C. F. C. Beeson, Indian Forest Service,

Forest Recorder Institute, Dehra Dun, U.P., India; Capt. Bushell, Imperial Bureau of Entomology, Natural History Museum, S. Kensington, S.W. 7; Major H. C. Gunton, M.B.E., Hobart, Gerrard's Cross, Bucks; Messrs. Owen Huth-Walters, M.A., Knoll Cottage, Ufford, Woodbridge, Suffolk; Percy I. Lathy, Curator to Mme. Horrack-Fournier, 90, Boulevard Malesherbes, and 70, Boulevard August-Blanqui, Paris; and Prof. Benedicto Raymundo, Director of the Museum of the Agricultural Society of Rio di Janeiro, 76, rua Senador Alencar, Rio di Janeiro, Brazil, were elected fellows of the Society.

RARE BRITISH BEETLE.—Mr. Bedwell exhibited a specimen of the beetle *Otiorrhynchus ligustici*, L., taken near Ventnor, one of the rarest of the British weevils, of which there has been no recent record.

FLUORESCENCE IN LEPIDOPTERA.—Drs. J. C. Mottram, F.Z.S., and E. A. Cockayne, D.M., F.R.C.P., gave a demonstration of fluorescence in Lepidoptera by ultra-violet radiation. In view of the interest which physicists have taken in the brilliant coloration of many birds and insects in an endeavour to explain them on a physical basis, it occurred to us that an examination in ultra-violet radiation would go far to decide whether or no fluorescence played any part in these brilliant colours. A number of representative British and Tropical *Lycaenidae*, some *Pyræles* which showed a mother-of-pearl iridescence, etc., were examined, but none of these showed any fluorescence. Most of the British moths and a large number of Tropical butterflies and moths belonging to widely different groups had been examined, but only a very small proportion proved to be fluorescent. The glistening yellow hindwings of *Troides* (*Ornithoptera*) *helena* and *T. darsius*, Gray, were very fluorescent, as were the yellow markings of *T. haliphron* and *T. remus*. The duller yellow of the females was less fluorescent than that of the males. The yellow on the abdomen of the males of *T. alexandrae*, *T. poseidon*, *T. urvilleana*, Guér., and *T. croesus*, Wall., and the thin yellow areas on the hindwings of the last-named species were fluorescent, but the other brightly coloured portions were non-fluorescent. Other fluorescent species were *Opisthograptis luteolata*, Dup., *Scoria lineata*, Scop. (*dealbata*, L.), *Aspilates gilvaria*, F., *Ourapteryx sambucaria*, L., *Hepialus humuli*, L. (male), *Hylophila bicolorana*, Fuesl. (white hindwings), *Halias prasinana* (white hindwings of female), *Cyaniris argiolus*, L. (undersides slightly fluorescent). It is interesting that the white males of *H. humuli* from the Shetlands are much less fluorescent than English ones, those with red markings on a white ground only very slightly fluorescent, and those coloured like females are non-fluorescent. It is so light when the males fly in the Shetlands, that the white coloration and fluorescence are not of much use. In the case of the Geometers both sexes are equally fluorescent. All are light-coloured and therefore conspicuous on the wing at dusk, and their fluorescence must add to their visibility.

EPPING FOREST.—The Secretary read a letter from the Essex Field Club protesting against a Parliamentary Bill for the permanent alienation of parts of Wanstead Flats and Epping Forest for allotments, and on his motion, seconded by Lord Rothschild, it was unanimously resolved to send a letter in similar terms to the Prime Minister, and others who might be interested in supporting the protest.

May 5th.—**SPECIAL MEETING.**—The Requisition of the Special

Meeting signed by the President and six other members of the Council, was read from the Chair.

Mr. Bethune-Baker proposed that the suggested alterations in the Bye-laws be received—seconded by Lord Rothschild and carried. The suggested alterations were then put separately before the meeting from the Chair.

ORDINARY MEETING.—ELECTION OF FELLOWS.—Mons. F. le Cerf, Curator of the Lepidoptera in the Paris Museum, 13, rue Guy de la Brosse, Paris; Miss Alice Ellen Prout, Lane End, Hambledon, Surrey; and Messrs. W. H. Tams, 8, Whitla Road, Manor Park, E. 12, and Alfred E. Tonge, Ashville, Trafford Road, Alderley Edge, Cheshire, were elected Fellows of the Society.

ZYGAENAS OF THE TRANSALPINA GROUP.—Lord Rothschild exhibited a long series of Zygaenas of the *transalpina* group together with a series of *Z. ephialtes* showing parallel variation, and Mr. Bethune-Baker in illustration exhibited with the epidiascope a number of slides showing the differences in the genital armature of the various species.

A METHOD OF COLLECTING AND STORING INSECTS, ETC., FIXED TO LEAVES, WITHOUT PRESSURE.—Mr. C. B. Williams showed the following method:—A small round shallow pill-box, with or without a glass lid, is taken and the inner cardboard ring separated from the rest of the box. For collecting the lid of the box with this inner ring in it are placed over the specimen on the leaf and the rest of the box beneath. On pressing the two halves of the box together the leaf with the specimen on it is pressed to the bottom of the box, where it is protected and kept into position by the cardboard ring, which is pushed back into its original position.

NEW AND LITTLE-KNOWN AUSTRALIAN INSECTS.—Mr. Denquet, who was present as a visitor, exhibited a number of Australian insects of various orders, many of which were still undescribed and unnamed.

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.

July 22nd.—A BAT PARASITE.—The President exhibited *Cimex pipistrellus*, a Hemipteron infesting the bat.

INDIAN LEPIDOPTERA.—Mr. Turner, a box of Lepidoptera collected by Mr. Grosvenor chiefly at Bangalore, India.

A CURIOUS EXPERIENCE.—Mr. Priske, recorded that in five of six traps set in Richmond Park for Coleoptera, five species of *Necrophorus* were caught, a different species in each trap, the sixth trap contained two species of *Silpha*.

SEASONAL NOTES: FAILURE TO BREED *P. LIVORNICA*.—Mr. Newman. an alien plant *Bupleurum fruticosum*, growing in abundance near Darenth. He also reported non-success in getting the larvæ of *Phryxus livornica* to pupate, abundance of *Argynnis aglaia*, fair numbers of *Plebeius aegon*, the apparent disappearance of *Melanargia galathea* from W. Kent, and that nearly everything in captivity was making a second brood.

August 12th.—DECEASE OF W. WEST (OF GREENWICH).—The death of Mr. W. West (of Greenwich), on July 30th, was announced. He

was one of the original members of the Society in 1872, and the Honorary Curator from the beginning.

FRENCH CAPTURES.—Mr. H. Main exhibited from the S. of France, larvæ of *Ascalaphus* sp., *Euvanessa antiopa*, *Papilio alexanor*, *P. podalirius*, and *Myrmelion* sp., with ova of *Parnassius apollo* and *Mantis religiosa*, with parasites of the latter.

A LOCAL COCKROACH.—Mr. Priske, the cockroach *Ectobia perspicularis*, with its egg cases and the larva of *Microdon* sp. (Dip.) from an ant's nest.

ABERRATION OF *P. ATALANTA*.—Mr. B. S. Williams, *Pyrameis atalanta* having the lowest subapical blotch absent.

RECORDS.—Mr. Step, living specimens of *Dorcas parallelipedus* (Col.) from Wimbledon Park, and reported the Mountain Polypody, *Polypodium phegopteris* plentiful near Lyndhurst, Hants.

THREE RECORDS OF MICRO-LEPIDOPTERA.—Mr. Sich, pupal cases of *Aphelosetia* (*Elachista*) *cerussella* and the larval mines in a leaf of *Phragmites communis*, gathered at Byfleet during the Society's Field Meeting in July; and also the three British species of the genus *Ochsenheimeria*.

S. TETRALUNARIA.—Mr. Bunnett, *Selenia tetralunaria* from Farnborough, Kent.

August 26th.—HABITS, ETC., OF *M. RELIGIOSA*.—Mr. H. Main exhibited the early stages of *Mantis religiosa* from S. France, and several spiders, and gave notes on their habits as observed by him.

ABERRATION OF *P. PLANTAGINIS*.—Mr. Bowman, a male *Parasemia plantaginis* in which the right hindwing was suffused. It was of a brood of which 55 out of 60 pupæ emerged in four days.

VARIATION IN *H. FURCATA*, ETC.—Mr. Barnet, series of *Hydriomena furcata*, including green, light banded, variegated, and very light forms, from S. Devon, very yellow forms of *Ematurga atomaria* from Limpsfield, and a *Plebeius aegon* from Oxshott, with an unusually wide white submarginal band on the underside.

HABITS OF *C. IBIPENNELA*.—Mr. Sich gave details of the habits of the newly hatched larva of *Coleophora ibipennella*.

POLYMORPHISM OF *P. MEMNON*.—Mr. Edwards and Mr. Grosvenor, many forms of the polymorphic species *Papilio memnon* from the Indo-Malay Region.

Mr. Edwards then read a series of notes on the species.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

September 9th.—Mr. Stanley Edwards, F.L.S., Vice-President, in the chair.

Mr. J. B. Farmer, of Brixton, was elected a member.

Mr. Bowman exhibited a series of the spring-emerged half of a brood of *Ephyra porata* from ova and remarked on their close resemblance to the allied *E. punctaria*.

Mr. Main, larvæ of three parasites (Hym.) which attacked the Longicorn (Col.) *Rhagium inquisitor* in Epping Forest.

Mr. Turner, many species of Heterocera taken by Mr. Grosvenor in

India, chiefly Bangalore, including *Attacus edwardsi*, *Trabala vishnu*, *Crishna macrops*, *Zygaena cashmirensis*, etc.

Mr. H. Moore, *Mutilla europaea* (Hym.) from Bournemouth, with other *Mutilla* species from Egypt, Upper Amazons, Indiana, and the Ionian Isles.

Mr. Carr, pupæ of the cheese-mite, *Piophilæ casei* (Dip.).

Mr. Bunnett, the black aberration of *Coccinella hieroglyphica* (Col.) from Keston with the type.

September 23rd.—Mr. K. G. Blair, B.Sc., President, in the chair.

An Exhibition of Lantern Slides.

Mr. R. Adkin, views of old Selborne.

Mr. Tonge, resting habit of several British Geometers.

Mr. Main, seasonal forms of *Pieris napi*, stages and pupal chamber of *Timarcha laevigata* (Col.), ravages and metamorphoses of *Donacia* sp. (Col.).

Mr. Bedford (Eastbourne), rare species (Lep.) captured in Sussex, local birds, rare and local orchids, abnormal growths, etc.

Mr. Withycombe, *Chrysopa*, *Hemerobius*, *Syrphus*, and *Stratiomys*.

Mr. Colthrup, positions of rest of butterflies and moths, and habits of birds.

Mr. Dennis, Windermere and its flora, mosses from Windermere and E. Horsley.

GENERAL EXHIBITS.—Mr. Grosvenor, many species and forms of the genus *Terias* from India.

Mr. Bowman, a bred series of *Tricopteryx carpinata* from Oxshott with numerous forms having well-emphasised transverse lines on the forewings.

Mr. H. J. Turner, three species of *Eacles* (Lep. Het.), *E. imperialis*, N. York, *E. grandis*, Sao Paulo, and *E. sp. ?* from Cordoba, Argentine, sent by Mr. Lindeman, with coloured photographs of the larvæ of the two last.

Oct. 14th.—DONATION.—Mr. J. B. Farmer presented a box of British Odonata to the Society's collection.

ABERRATIONS OF BRITISH LEPIDOPTERA.—Mr. Riley, on behalf of Mr. South for Mr. Dolton, aberrations of (1) *Agriades coridon*, between ab. *albicans* and race *apennina*; (2) *Hibernia leucophaearia* conspicuous wavy lines on a clear ground; (3) dark grey-brown *Bupalus piniaria*.

A SMALL SURREY RACE OF *Z. FILIPENDULAE*.—Mr. Turner, a small race of *Zygaena filipendulae* from Box Hill, with 6th spot very feebly developed, including ab. *cytisi* and other aberrations.

H. PINASTRI LARVA.—Mr. Newman, living full-fed larva of *Hyloicus pinastri* from Suffolk.

ABERRATIONS OF *P. RAPAE*.—Mr. B. S. Williams, three *Pieris rapae* showing a discal spot on the hindwings, and a striate, asymmetrical form of *Rumicia phlaeas*.

IRISH *P. NAPI*; GYNANDROMORPH OF *P. RAPAE*.—Mr. Johnson, banded females of *Pieris napi* from Ireland, one being yellow suffused, confluent *Zygaena trifolii* from Folkestone, and a gynandromorph of *P. rapae*.

INDIAN PIERIDS SHOWN.—Mr. Grosvenor, *Pieris canidia* various forms, *P. krueperi* and *P. rapae* from India.

P. CHI AND ITS VARIATION.—Mr. Mera, *Polia chi* closely approaching form *olivacea*.

POOLE COLEOPTERA.—Mr. Blenkarn, *Carabus nitens* and other Coleoptera from Poole.

SEASONAL NOTES.—Seasonal notes from several members.

OBITUARY.

A. E. Hudd, F.E.S., F.S.A.

The death of A. E. Hudd of Canford, near Bristol, is announced. He is known to entomologists for his "Catalogue of the Lepidoptera of the Bristol District" published in 6 parts from 1877 to 1884. From the *Bristol Times* we understand that he was a man of many parts. A founder of the Clifton Antiquarian Club and for long its Hon. Secretary, an original member of the Bristol and Gloucestershire Archæological Society and a vice-president, an original member of the British Naturalists Society and on its Committee, on the council of the Photographic Society, for 16 years he superintended the excavation of the Roman station at Vento Silurum, Caerwent, took a great interest in Egyptology, frequently visiting the Nile basin during the excavations by Prof. Flinders Petrie, and was much interested in old Bristol and its historic monuments as well as working on behalf of the Deaf and Dumb and the Blind. From a letter before us written to our late editor in November, 1900, we read "The 'Bristol' records in Stainton's *Manual* were all contributed, I believe, by Mr. Geo. Harding, then of Stapleton, and Mr. P. H. Vaughan, then of Redland, both of whom are still living. The latter looked through the MS. of my list and made many additions of exact localities and especially of the *Tineina*; he and Mr. H. Grigg were my chief recorders of these." He was instrumental in early investigation of the *Psychides*, see Tutt *Brit. Lepid.*, vol. ii., p. 248. He sent a while ago to the Rev. C. R. N. Burrows one of the sets of specimens upon which Harding (*E.M.M.*, ix. p. 91-93, xii. p. 163) based his theory as to the ♀ *Luffia ferchaultella*, being the parthenogenetic ♀ of *N. monilifera*. He was a Fellow of the Entomological Society and of the Society of Antiquaries.—H.J.T. (communicated).

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Journal of Variation

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(The completion of the Supplement on Hübner's Tentamen is promised for the January number with the Special Index.)

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A Gynandromorph of *Monomorium floricola*, Jerd.

By W. C. CRAWLEY, B.A., F.E.S.

In 1903 Wheeler published a list of all the known cases of Gynandromorphs among ants, with descriptions of six more, which brought the total to 23, and in 1914 the same author gave an account of seven additional ones described during the decade 1903-13, these bringing the total up to 30. In 1915 Donisthorpe gave a list with a description of two gynandromorphs of *Myrmica scabrinodis*, Nyl. These, together with one of *Monomorium floricola*, Jerd., and *Formica rufibarbis*, F., described by Donisthorpe previously in 1914 and 1915 respectively, brought the total to 34. Recently Santschi (1920) published a note, "La 39me. Fourmi hermaphrodite," with a list of four described since Donisthorpe's 1915 paper, viz., *Phyracaces singaporensis*, Viehm., *Myrmica rugulosa*, Nyl., *Acanthomyops latipes*, Walsh., and *Camponotus (Colobopsis) albocinctus*, Ash., and added a fifth, *Tetramorium simillimum*, Sm. He overlooks, however, three cases described by Donisthorpe, viz., *Myrmica laevinodis*, Nyl. (1917), *M. laevinodis* var. *ruginodo-laevinodis*, For. (1918), and *M. sulcinodis*, Nyl. (1919). The total, therefore, at the date of Santschi's paper was 42, not 39.

Among the collections of the late Dr. H. Swale, from Samoa, is a gynandromorph of *Monomorium floricola*, Jerd., the second from Samoa found by Dr. Swale (the other being the *Tetramorium simillimum* described by Santschi), and the second of the species to be described. As will be seen, however, from a comparison of the two descriptions, the new specimen, which brings the list to 43, is quite different from the former, since, though a lateral gynandromorph, the thorax is entirely ♂ in shape.

Description.—Length 3mm. (normal ♀ found in same colony measures 3.6mm., and a normal ♂ 2.8mm.).

Colour more or less that of a ♂ (though slightly paler), except the gaster, which is coloured more like that of a ♀, i.e., less dark than in the ♂. The left side (viewed from behind) of the postpetiole is paler than the right side.

Head.—Left side, including the four-toothed mandible, the clypeus, the compound eye and left ocellus, ♀, but the whole side of head is shorter than a normal ♀ head; left antenna ♀, but both scape, funiculus, and joints of funiculus in proportion to their width, shorter than normal. Right side ♂, the mandible and right half of the clypeus being somewhat distorted; compound eye, right and centre ocelli ♂; right antenna ♂, size normal.

Thorax, including legs, epinotum and pedicel, ♂; the left side of 2nd node more developed than the right. Gaster almost entirely ♂, though the left side of first segment is more ♀ in form, and the left side of apex is ♀. Wings normal.

The right side of the apical segments contains a perfectly formed and quite normal half of a ♂ genital armature. The dried state of the body rendered it impossible to examine the gaster for ♀ organs.

Sculpture.—Clypeus more finely striated, and rather less so than in the ♂. The ♂ side of head has normal ♂ sculpture, and the ♀ side normal ♀ sculpture. The rest of sculpture ♂.

Lotopa, Samoa, April 29th, 1917 (H. Swale).

DECEMBER, 1920.

LITERATURE.

Mr. Donisthorpe has very kindly collected for me all the references quoted in this paper.

Donisthorpe, *Ent. Rec.*, 26, 136 (1914).

„ *British Ants*, 323 (1915).

„ *Ent. Rec.*, 27, 258-259 (1915); 29, 31 (1917); 30, 22 (1918); 31, 1 (1919).

Santschi, *Bull. Soc. Vaudo. Sci. Nat.*, 53, 175-178 (1920).

Viehmeier, *Arch. Naturg.*, 81, 111 (1915),

„ *Ent. Mit.*, 6, 71 (1917).

Wheeler, *Bull. Amer. Mus. N.H.*, 19, 65-8-83 (1903); 48, 49-56 (1914).

„ *Psyche*, 26, 2-5 (1919).

Some records of, and observations on, the Flying-habit of Butterflies when paired.

By B. C. S. WARREN, F.E.S.

During the last few years many interesting notes on the flying-habits of butterflies when paired, have appeared in the *Entomologist's Record*; and having myself, in the same period, made observations on seventy-nine pairs belonging to forty-four species of butterflies, I naturally was much interested in comparing other collectors' records with my own. In the June number of 1917, Mr. C. W. Colthrup suggests that certain species exhibit different habits on the Continent and in England. I may note at once that this is not so, but only a misconception arising from a want of sufficient data.

Some very interesting observations of Donzel's, written in 1837, were given by Mr. H. J. Turner (*Ent. Rec.*, vol. xxviii. p. 88.) In these Donzel advocates the theory that the carrying habit is the same for all the species of a genus, and is therefore a valuable characteristic in determining the limits of genera. All my observations, and the records I have seen, have given such complete confirmation of this theory, that in the future should any apparent exception be noted, I should feel no doubt that it was merely our conception of the genus in question which was at fault. The fact that there are some few species in which both sexes are able to carry, is not the least antagonistic to the theory; it being merely the case that all the species of the genera concerned, exhibit this unusual habit. It may well be though, that this habit is more general than is at present known, only we have not sufficient data to establish the fact.

The following are the instances which have come under my observation; in each case notes were taken on the spot and not trusted to memory.

Genus *Erynnis*.

E. lavaterae, observed once. At Vernayaz, Valais. July 7th, 1917. ♀ carried ♂.

Genus *Hesperia*.

H. ryffelenensis, observed once. On the Parpaner-Rothorn, Grisons. August 8th, 1919. ♀ carried ♂.

H. serratulæ, observed once. In the Val Sporz, Lenzerheide, Grisons. July 12th, 1919. I took a pair, but unfortunately they

separated before I could induce them to fly. The ♀ kept its wings open and showed an inclination to crawl about, the ♂ keeping its wings folded tightly. (Suggests that the ♀ would carry.)

Genus *Nisoniades*.

N. tages, observed three times. At Follaterre, Valais. July 29th 1916. ♀ carried ♂. At Caux, Vaud. June 1st, 1917. ♀ carried ♂. In the Stockenwald, Kandersteg, Bernese Oberland. May 22nd 1918. ♀ carried ♂.

Genus *Chrysophanus*.

C. hippothoë var. *eurybia*, observed once. At Lenzerheide, Grisons. July 19th, 1919. ♀ carried ♂.

Genus *Loweia*.

L. subalpina, observed once. At Spoina, Lenzerheide, Grisons. July 4th, 1919. ♂ carried ♀.

Genus *Rumicia*.

R. phlaeas, observed once. At Vernayaz, Valais. August 22nd, 1916. ♀ carried ♂.

Genus *Lycaena*.

L. arion, observed once. In the Ueschinen Tal, Bernese Oberland. June 13th, 1918. ♀ carried ♂.

This is very interesting in view of the fact that among all the "blues" (with one other exception, so far as is at present known) the ♂ carries. Records of the habits of *arcas*, *euphemus*, *alcon*, *melanops* and *iolas* would be most instructive.

Genus *Cupido*.

C. sebrus, observed once. At Follaterre, Valais. May 9th, 1916. ♂ carried ♀.

Genus *Everes*.

E. alcitas, observed twice. At Branson, Valais. May 18th, 1916. ♂ carried ♀. July 29th, 1916. ♂ carried ♀.

Genus *Glaucopsyche*.

G. cyllarus, observed once. By the Gryonne River, St. Triphon Vaud. May 2nd, 1916. ♂ carried ♀.

Genus *Cyaniris*.

C. semiargus, observed once. In the Ueschinen Tal, Bernese Oberland. June 30th, 1918. ♀ carried ♂. The only "blue" beside *arion* as yet recorded with the ♀ carrying.

Genus *Aricia*.

A. eumedon, observed once. At Masons, Lenzerheide, Grisons. July 3rd, 1919. I took a pair but could not make them fly. While falling to the ground after being thrown into the air, the ♀ expanded her wings, but did not try to fly, the ♂ did not move. Is this another "blue" species of which the ♀ carries? Unfortunately I have not had the good fortune to observe *medon* or *donzelii*.

Genus *Hirsutina*.

H. damon, observed once. Between Solis and Obervatz, Grisons. July 31st, 1919. ♂ carried ♀.

Genus *Agriades*.

A. coridon, observed five times. At Champéry Valais. July 11th, 1915. ♂ carried ♀. 26th, 1915. ♂ carried ♀. 28th, 1915. ♂ carried ♀. At Eclépens, Vaud. August 16th, 1915. ♂ carried ♀. In the Ueschinen Tal, Bernese Oberland. July 19th, 1918. ♂ carried ♀.

A. thetis, observed once. At Lenzerheide, Grisons. June 28th, 1919. ♂ carried ♀.

Genus *Polyommatus*.

P. icarus, observed five times. At Follatterre, Valais. May 9th, 1916. ♂ carried ♀. At Branson, Valais. May 9th, 1916. ♂ carried ♀. 18th, 1916. ♂ carried ♀. At Follatterre, Valais. July 18th, 1916. Two pairs observed, ♂ carried ♀ in each case.

P. hylas, observed four times. At Verossaz, Valais. June 23rd, 1916. ♂ carried ♀. At Masons, Lenzerheide, Grisons. July 5th, 1919. ♂ carried ♀. 6th, 1919. ♂ carried ♀. Val Sporz, Lenzerheide, Grisons. July 12th, 1919. ♂ carried ♀.

Genus *Latiiorina*.

L. orbitulus, observed four times. Val Sporz, Lenzerheide, Grisons. July 11th, 1919. Three pairs observed. ♂ carried ♀ in each case. At Masons, Lenzerheide, Grisons. July 17th, 1919. ♂ carried ♀.

Genus *Parnassius*.

P. apollo, observed once. In the Ueschinen Tal, Bernese Oberland. July 9th, 1918. Found a pair but was unable to make them fly. When in the grass the ♀ crawled about dragging the ♂, which remained immovable. It is therefore probable that the ♀ carries should they fly.

Genus *Aporia*.

A. crataegi, observed eight times. At Branson, Valais. May 21st, 1915. ♀ carried ♂. At Sion, Valais. May 25th, 1915. Four pairs observed. ♀ carried ♂ in each case. At Eclépens, Vaud. June 2nd, 1916. Three pairs observed. ♀ carried ♂ in each case. This suggests a closer connection with *Parnassius* than with *Pieris*.

Genus *Pieris*.

P. napi var. *bryoniae*, observed once. In the Ueschinen Tal, Bernese Oberland. June 30th, 1918. ♂ carried ♀.

P. manni, observed once. At Vernayaz, Valais. July 10th, 1914. ♂ carried ♀.

Genus *Dryas*.

D. paphia, observed twice. At Vernayaz, Valais. July 7th, 1917. ♀ carried ♂. Between Aigle and Sépey, Vaud. July 12th, 1917. I saw a pair in flight, but could not catch them. ♀ carried ♂ I should say, but I could not be certain. Previous records leave no doubt that both sexes can carry in this genus, as they can in the following.

Genus *Argynnis*.

A. aglaia, observed three times. Val Sporz, Lenzerheide, Grisons. July 22nd, 1919. ♂ carried ♀. 28th, 1919. ♂ carried ♀. August 2nd, 1919. ♀ carried ♂. This establishes the fact that both sexes of this species can carry; previous records have only noted the ♀ as carrying.

A. niobe, and var. *eris*, observed once. In the Ueschinen Tal, Bernese Oberland. July 9th, 1919. I took a pair. The ♂ type, and the ♀ var. *eris*. On liberating them the ♂ carried ♀. On starting them a second time the ♂ again flew; but they fell into some long grass where I found both struggling. Subsequently the ♀ crawled up a grass stem and took to flight for a short distance. On my reaching them for the fourth time the ♀ again flew, and this time so far that I was unable to find them again.

Var. *eris*, both sexes, observed once. At Follatterre, Valais. June 16th, 1915. ♀ carried ♂. Mr. Turner's and the late Mr. Tutt's records, have already shown that both sexes of *niobe* could carry; but the above note is, I think, the first record of both sexes of a given pair flying alternately. Of *cydippe* Mr. Wheeler has recorded the ♀ carrying (*Ent. Rec.*, vol. xxviii., p. 204), and Dr. Dixey that the ♂ can carry (*Proc. Ent. Soc. Lond.*, 1915). So this habit is common to all three species.

Genus *Brenthis*.

B. euphrosyne, observed once. At Lenzerheide, Grisons. June 13th, 1919. I found a pair at rest, but failed to make them fly. When thrown in the air the ♀ fluttered her wings slightly, the ♂ remaining still. On the ground both made endeavours to walk, the ♀ being the most animated. (Suggests that ♀ would carry if flight took place.)

B. ino, observed once. At Lenzerheide, Grisons. July 26th, 1919. Unfortunately separated before flying.

Genus *Melitaea*.

M. athalia, observed once. At Eclépens, Vaud. June 2nd, 1916. ♀ carried ♂.

M. didyma, observed twice. At Follatterre, Valais. July 29th, 1916. ♀ carried ♂. At Vernayaz, Valais. July 7th, 1917. ♀ carried ♂.

Genus *Pararge*.

P. hiera, observed once. At Kandersteg, Bernese Oberland. June 13th, 1918. ♀ carried ♂.

P. maera, observed once. At Salvan, Valais. July 1st, 1916. ♀ carried ♂.

P. megera, observed once. At Eclépens, Vaud. August 16th, 1915. ♀ carried ♂.

Genus *Enodia*.

E. dryas, observed twice. At Eclépens, Vaud. August 7th, 1916. ♀ carried ♂. August 14th, 1918. ♀ carried ♂.

Genus *Epinephele*.

E. jurtina, observed once. At Sierre, Valais. June 12th, 1915. ♀ carried ♂.

E. tithonus, observed once. At Eclépens, Vaud. August 7th, 1916. ♀ carried ♂.

Genus *Coenonympha*.

C. satyrion, observed once. At Masons, Lenzerheide, Grisons. June 29th, 1919. ♀ carried ♂.

C. tiphon, observed once. At Masons, Lenzerheide, Grisons. July 17th, 1919. ♀ carried ♂.

Genus *Erebia*.

E. oeme, observed twice. In the Ueschinen Tal, Bernese Oberland. July 7th, 1918. Two pairs observed. ♀ carried ♂ in each case.

E. manto, observed twice. At Champéry, Valais. July 29th, 1915. Two pairs observed. ♀ carried ♂ in each case.

E. euryale, observed once. At Champéry, Valais. July 20th, 1915. ♀ carried ♂.

E. aethiops, observed once. In the Ueschinen Tal, Bernese Oberland. July 22nd, 1918. ♀ carried ♂.

E. gorge, observed three times. On the Grammont, Valais. July 19th, 1917. Two pairs observed. ♀ carried ♂ in each case. Urden Fürkli, Grisons. August 8th, 1919. ♀ carried ♂.

Genus *Melanargia*.

M. galathea, observed three times. At Champéry, Valais. July 8th, 1915. ♀ carried ♂. 9th, 1915. ♀ carried ♂. 11th, 1915. ♀ carried ♂.

It will be noticed, if looking over the last six genera mentioned, that in the case of every Satyrid species noted, the ♀ carries. Also of all previous records, all except two, give this result. It is, therefore, of particular interest to enquire into those two cases. The first is a note of the late Mr. Tutt's, quoted by Mr. Colthrup (*Ent. Rec.*, vol. xxix. p. 17), which states that the ♂ of *M. galathea* always carries the ♀. If this is so, then *Melanargia* is a third genus in which we find both sexes carrying. In view, however, of the considerable amount of data available on Satyrid species, I cannot help wondering if this record is the result of a *lapsus calami*; or perhaps a printer's error. Possibly some of Mr. Tutt's personal friends could throw some light on the matter.

The second instance was a casual statement in the course of other remarks by Dr. Verity (*Ent. Rec.* 1919, p. 68), that the ♂ *S. circe* carried the ♀. I wish Dr. Verity would let us know if this is the result of personal observation, or merely a quotation; if the latter, was the source one to be relied on? In this case should Dr. Verity confirm the record, not having any other data of the habits of this species, we must await further observations to ascertain if both sexes can carry in the genus *Satyrus*, or only the ♂. This last seems most improbable, but of course it may be so; it is even possible that a small section composed of *S. circe* and those species most closely connected to it, may have developed this habit independently of the other species.

Any one who has read this paper must have noticed how fragmentary our knowledge of these flying-habits is, and how much further records are to be desired. To obtain such records is, however,

not at all so simple a matter as it would appear; and to establish with *absolute certainty*, which sex of a pair is flying, is often a difficult matter, and one not to be done at a glance. This is perhaps why there still remain so large a number of species of whose habits we are in ignorance.

Lepidoptera in Peninsular Italy during the year 1920.

By O. QUERCI.

From the month of March till October of 1920 my family and I have uninterruptedly collected Lepidoptera in Italy. The emergence of the species has been so different from that of the preceding years that I think it would be useful to note the phenomena observed with a view to furnish data concerning the influence of the season on the development of insects.

The winter of 1919-20 began with excessive cold, but after some days the weather became fine and the climate very mild. In the month of March vegetation in the country was in full progress, and I made an excursion into the Tuscan Maremma to see if, with such a favourable season, there would be a precocious emergence of insects to be collected at the beginning.

On the 25th of March I left Florence on a bicycle in order to be able to stop at localities which seemed promising, and I visited all the uncultivated spots on the coast of the Tyrrhenian Sea, from Cecina to Follonica, but I only saw examples of *Leptosia sinapis* and *Coenonympha pamphilus*.

Seeing that it was useless to continue my journey, I returned to Florence and began to examine the hills near the city, but though the weather was beautiful, the Lepidoptera didn't begin to emerge till the second half of April, and continued (not very abundantly) in May, and disappeared completely at the beginning of June. After the winter rains no water had fallen, the plants were dried up at their birth, and the life of insects was evidently impossible under such conditions.

The species collected in the environs of Florence, from April 17th to June 3rd, are the following:—

Nisoniades tages, L., race *clarens*, Caradja, I., gen. *tages*, L.—An abundant emergence on April 17th, after which all the specimens were spoilt. The females which, in preceding years, were very scarce, were instead very abundant.

Erynnis altheae, Hb., race *australiformis*, Vrtý., I. gen. *altheae*, Hb.—Always scarce, only four specimens this year.

Erynnis lavatherae, Esp., race *australior*, Vrtý.—One sole specimen.

Hesperia onopordi, Ramb., race *fulvotincta*, Vrtý., I. gen. *onopordi*, Ramb.—Even scarcer than in the preceding years; only five specimens.

Hesperia armoricanus, Obth., race *fulvoinspersa*, Vrtý., I. gen. *armoricanus*, Obth.—The males emerged from the 1st to the 22nd of May; only one female collected on April 28th.

Hesperia malvoides, Elw. and Edw., race *pseudomalvae*, Vrtý., I. gen. *pseudomalvae*, Vrtý.—Emerged from April 28th to May 8th; scarce.

Hesperia sidae, Esp., race *occidentalis*, Vrtý.—Emerged in exceptional number during the month of May.

Powellia sao, Hb., race *gracilis*, Vrtý., I. gen. *sao*, Hb.—In May the females, as always, very scarce.

Adopaea lineola, Ochs., race *clara*, Tutt.—Always scarce; six specimens only in May.

Adopaea flava, Brunnich (= *thaumas*, Hufn.), race *iberica*, Tutt.—Very scarce this year from May 22nd to 30th.

Thymelicus acteon, Rott., race *acteon*, Rott.—Abundant in the past years. A few specimens from May 18th to 23rd, and one female only.

Augiades sylvanus, Esp., race *sylvanus*, Esp., I. gen. *sylvanus*, Esp.—Two males only on May 8th, and no female. The males were most abundant in preceding years.

Rumicia phlaeas, L., race *nigrioreleus*, Vrtý., I. gen. *phlaeas*, L.—The first generation is never abundant at Florence; this year I only saw one specimen.

Loweia doris, Hufn., race *italorum*, Vrtý.—The first brood missed altogether this year.

Loweia alciphron, Rott., race *mirabilis*, Vrtý.—This splendid race, has hitherto been found only on the Monte Senario, 2,400ft., near Florence. We look for it carefully every year, but have never succeeded in taking more than one or two females a year. After several trips to Monte Senario we collected this year five males and one female on May 30th.

Glaucopsyche cyllarus, Rott., race *pauper*, Vrtý.—From April 16th to May 4th.

Scolitantides baton, Bgstr., race *baton*, Bgstr., I. gen. *praecocior*, Vrtý.—The first brood was relatively abundant this year, from April 17th to May 22nd. The blue females a good many.

Agriades aragonensis (Gerh.), Vrtý., race *florentina*, Vrtý., I. gen. *florentina*, Vrtý.—Numerous in May. Few specimens of *radiata*.

Agriades thetis, Rott., race *etrusca*, Vrtý., I. gen. *maja*, Vrtý.—Very scarce in May.

Agriades escheri, Hb., race *splendens*, Stef.—Rather abundant from May 20th to 30th. On the 29th of this month I collected a marvellous female with the upper surface of the forewings entirely covered by shining blue scales.

Agriades thesites (Gerh.), Chapman, race *meridiana*, Vrtý., I. gen. *hibernata*, Vrtý.—From April 17th till May 30th. In some females the upper surface of the wings more or less covered by blue scales.

Polyommatus icarus, Rott., race *zelleri*, Vrtý., I. gen. *zelleri*, Vrtý.—A few specimens emerged from April 28th to May 28th. Only two specimens of the *icarinus*, Scriba, form.

Cyaniris semiargus, Rott., race *cimon*, Lewin.—In Florence it has never been so abundant as this year. I collected nine specimens, whilst in the past I never found more than one or two in the year.

Aricia medon, Hufn., race *pallidiflava*, Vrtý., I. gen. *subornata*, Vrtý.—A few males from April 16th to May 6th.

Plebeius aegon (*argus*), L., race *apenninica*, Vrtý.—A few specimens at Monte Morello, 2,000ft., from May 23rd to May 30th.

Lycaenopsis (*Celastrina*) *argiolus*, L., race *calidogenita*, Vrtý., I. gen. *calidogenita*, Vrtý.—The first brood is always very scarce; I have found only five specimens in good condition.

Cupido minimus, Fuessl., race *minimus*, Fuessl.—A few from April 28th to May 8th.

Cupido sebrus, B., race *sebrus*, B.—Also this species, always rare, has been abundant this year from April 28th to May 22nd.

Everes alcetas, Hb., race *alcetas*, Hb.—Two males only.

Callophrys rubi, L., race *virgatus*, Vrtty.—Scarce from April 17th to May 8th. A very beautiful male, has strange splashes of light colour on the forewings.

Nordmannia ilicis, Esp., race *inornata*, Vrtty.—Nearly always extraordinarily abundant, but this year only a few specimens at end of May.

Hamearis lucina, L., race *lucina*, L.—Did not emerge at all, whilst in 1918 and 1919 it was abundant.

Gonepteryx rhamni, L., race *transiens*, Vrtty.—Only one specimen, whilst generally it is seen in hundreds.

Gonepteryx cleopatra, L., race *europaeus*, Vrtty.—No specimens.

Colias croceus, Fourc. (= *edusa*, F.), race *croceus*, Fourc., I. gen. *vernalis*, Vrtty.—A few males in April; one female only in May. In some years also this first brood is abundant.

Colias hyale, L., race *calida*, Vrtty., I. gen. *vernalis*, Vrtty.—During the 35 years which I have collected Lepidoptera, I have never seen so many of the first brood of *C. hyale* as I have collected this year. There was a great emergence in the middle of April, and I continued to find very fresh specimens until the middle of May.

Leptostia sinapis, L., race *bivittata*, Vrtty., I. gen. *lathyri*, Hb.—Rather abundant in April and May.

Anthocharis cardamines, L., race *meridionalis*, Vrtty.—Rare in April.

Euchloë ansonia, Hb., race *romana*, Calb.—Always very rare at Florence.

Pontia daplidice, L., race *daplidice*, L., I. gen. *bellidice*, Ochs.—Three specimens only. The first brood is never abundant, but this year even the succeeding broods were wanting.

Pieris napi, L., race *vulgaris*, Vrtty., I. gen. *vulgaris*, Vrtty.—A few specimens in April.

Pieris rapae, L., race *rapae*, L., gen. *metra*, Steph.—Very scarce this year.

Pieris manni (Mayer), Turati, race *rossii*, Stef., I. gen. *farpa*, Frühst.—Only one specimen in May, and only this one was found during the whole year.

Pieris Mancipium brassicae, L., race *catolenuca*, Rüb., I. gen. *chariclea*, Steph.—Of this species, always very common, I only saw a few specimens flying over the gardens.

Aporia crataegi, L., race *meridionalis*, Vrtty.—Completely wanting. I only saw four specimens in May.

Coenonympha pamphilus, L., race *australis*, Vrtty., I. gen. *australis*, Vrtty.—Emerged in April and May, but not so abundant as usual.

Coenonympha arcanius, L., race *tenuelimbo*, Vrtty., I. gen. *tenuelimbo*, Vrtty.—Frequent from May 23rd to 30th.

Pyronia ida, Esp., race *neapolitana*, Obthr.—Totally wanting in all the regions of Italy visited by us this year.

Pyronia tithonus, L., race *etrusca*, Vrtty.—Abundant in June. The females appeared, as always happens, when the males were already old.

Epinephele jurtina, L.—Dr. Verity was of opinion that this race was identical with the race *phormia* of Frühstorfer, but having him-

self collected in the Tyrol the co-types of the *phormia*, he is convinced that it is a case of distinct races. The *E. jurtina* has always been the commonest butterfly in the environs of Florence, but in June, 1920, the epoch of greatest emergence of this species, only very few specimens were to be seen in the dry and burnt-up country.

Melanargia galathea, L., race *florentina*, Vrtý.—The emergence of this common species was also very scarce.

Pararge megera, L., race *megera*, L.—A few specimens in the second half of April.

Pararge maera, L., race *appenina*, Vrtý., I. gen. *appenina*, Vrtý.—Only five specimens.

Pararge aegeria, L., race *italica*, Vrtý., I. gen. *italica*, Vrtý.—One specimen.

Limenitis rivularis, Scop. (= *camilla*, auctorium), race *reducta*, Stgr., I. gen. *reducta*, Stgr.—Seven males and no females.

Melitaea didyma, Esp., race *protea*, Vrtý., I. gen. *protea*, Vrtý.—Scarce from May 8th to the 30th.

Melitaea phoebe, Knoch, race *tusca*, Vrtý., I. gen. *tusca*, Vrtý.—Very scarce.

Melitaea cinxia, L., race *australis*, Vrtý.:—Much more abundant in May than in the other years.

Melitaea athalia, Rott., race *tenuis*, Vrtý.—A few males at the beginning of June. The females ought to have emerged at the time when there occurred the phenomenon of the cessation of all species, and they therefore did not appear.

Issoria lathonia, L., race *emiflorens*, Vrtý., I. gen. *lathonia*, L.—Entirely missed.

Brenthis hecate, Schiff., race *florida*, Vrtý.—The males of this fine race, hitherto found only near Florence, and so different from the typical race of Austria, emerged in unusual abundance on May 30th, and we were able to make a good collection of them, but with June 1st, from some cause not to be explained, all the Lepidoptera ceased to appear, as I have already said. The continual search by my son-in-law, Dr. Romei, to find the females of *B. hecate*, had no result. In the country, which was burnt up as if a fire had passed over it, with a sky perfectly cloudless, and a sun burning hot, there only flew a few remnants of *E. jurtina* and *P. tithonus*.

Brenthis dia, L., race *laetior*, Vrtý., I. gen. *laetior*, Vrtý.—The first brood of this species is considered by us to be a real rarity of Florence. This year, on the contrary, there was a great emergence on April 18th.

The *Papilionidae* and the *Vanessidi* were quite wanting. A few individuals of the *Zygaenides* emerged as *Procris cognata* and *P. statices*, *Z. achilleae*, race *triptolemus*, Hb., *Z. stoechadis*, Bkh., *Z. transalpina*, race *intermedia*, Rocci, *Z. oxytropis*, B., *Zygaena erythrus*, Hb., *Z. punctum*, O., *Z. scabiosae*, Schev., and even the very common *Z. carniolica* race *florentina*, Vrtý., did not appear at all.

I have delayed mentioning the emergence of the different species to draw from them biological conclusions, which to me are most interesting. For seven years we have collected continually in the environs of Florence, and what has struck us the most in the researches of last spring is that the most common species as *A. thetis*, *P. icarus*, *G. rhamni*, *C. croceus* (*edusa*), *P. napi*, *P. rapae*, *M. (P.) brassicae*, *A.*

crataegi, *C. pamphilus*, *E. jurtina*, *P. megera*, and *M. galathea* had become the scarcest, whilst others which are always scarce, such as *H. sidae*, *A. escheri*, *C. semiargus*, *C. sebrus*, *N. acaciae*, *C. hyale*, *B. hecate*, and *B. dia* appeared in abundance. To be noted also is the almost total suppression of *E. lavatherae*, *H. onopordi*, *R. phlaeas*, *N. ilicis*, *G. rhamni*, *G. cleopatra*, *P. manni*, *A. crataegi*, the *Papilionidae* and the *Vanessidae*.

The emergences of the species was anticipated by about 15 days in comparison with what happens in normal years. The females felt the adverse condition even more than the males. It would seem that their development, necessarily longer and more complicated from the formation of the organs of egg production, was decidedly impeded, and the greater part of the chrysalids died in the larval state.

Worthy of note also is the sudden emergence of *N. tages* and *B. hecate*, which took place on one day only, and then ceased suddenly. Most notable of all was the sudden cessation of emergences of all Lepidoptera which happened in the plains at the beginning of the month of June, and in the mountains at the beginning of July. The "SUMMER PAUSE," which we consider due to excessive heat and the absolute dryness of the Italian peninsula, and which generally occurs from July 20th to August 5th, lasted this year instead from June 12th to September 5th on the Florentine hills.

(To be continued.)

SCIENTIFIC NOTES AND OBSERVATIONS.

ON THE LIFE HISTORY OF *GONEPTERYX CLEOPATRA*.—I was very interested to read the letter on this subject from Mr. Simes, and, as I have experimented with this beautiful insect for the last eleven years, I may perhaps be permitted to make some observations. I stocked my covered-in butterfly garden at East Farleigh with this insect in 1909, obtaining my stock from two different localities. Some four years later, with the kind assistance of Dr. Chapman, I introduced some fresh blood from a third locality. As all the butterflies have acted in precisely the same manner, I think we may accept their actions as the true life history of the species. It is as follows:—The females (I am going principally to speak of them) *pair invariably before hibernation*. They retire under ivy leaves and other evergreen leaves and remain tight till about April. Last season, being unusually early, ova were laid in March. Two years ago I noted one ♀ who remained tight till May 14th. The big summer brood begins to emerge, as a rule, about the middle of June, while many of the hibernated ♀♀ are still on the wing. These old ♀♀ sometimes pair for a second time with one of the younger generation. The fresh ♀♀ pair at once. I think it was three years ago that Mr. Frohawk was with me in the garden in mid-June. I pinned out three freshly emerged ♀♀, hanging to their pupa cases and drying their wings. When we passed the spot about half-an-hour later we noticed that all three were paired up, never having flown. This very frequently happens. I often go round the garden with a lamp at night at mid-summer and count fifteen to twenty pairs *in cop* on shrubs and creepers where they are almost invisible by sunlight. We carried out an elaborate experiment one year in order to find out what proportion of them laid at once and

what retired for the winter first. Forty healthy females were employed, and by means of ink marks, black and red on the wings, we got the following results. All paired, fourteen laid at once, twenty-six started hibernation. Some of these, of course, came to grief later. Therefore, about one out of every three lays at once, and, as this happens again with a later brood, it is only fair to call *cleopatra* continuous brooded, as far as the climate permits. When I left East Farleigh on October 25th last there were about sixty ♀ ♀ in hibernation, also some ♂ ♂; and, in addition to these, there were a few restless ♀ ♀ who came out whenever the sun permitted and laid. I noticed this happening very shortly before I left. There were a good many nearly full fed larvæ on bushes of *Rhamnus alaternus*, *R. alpina* and *R. hybridus*, and plenty of ova. Had these larvæ been taken in and fed under glass a good proportion would have pupated and the pupæ would have lived till about the end of the year and then "gone off." In one instance only can I positively assert that a pupa lived through the winter and produced a fine ♂ about the middle of April.

A few years ago I showed about a dozen nearly full fed larvæ on or about November 20th at a meeting of the Entomological Society of London. If we are all alive next August or September I shall be very pleased to send Mr. Simes ova, larvæ, pupæ and imagines, but I shall be still more pleased if he can spare the time on a hot July day to run down to East Farleigh, Maidstone, to see *G. cleopatra* in her glory.—(Capt.) E. B. PUREFOX, F.E.S., 87, Oakley Street, Chelsea.

NOTES ON COLLECTING, Etc.

ADDITIONAL NOTES ON THE ENTOMOLOGICAL FAUNA AND ON THE FLORA OBSERVED IN THE TURIN DISTRICT FROM JULY TO OCTOBER, 1919, INCLUSIVE.—The heat at Turin in July and August being greater than that at Rome, the collecting of flowers and insects was difficult work to carry out, however, by making up one's mind to "stick it," I managed to do a fair amount during these two months, although the summer heat this year, 1919, was considered abnormally hot by the Italians. The second brood of *Brenthis selene* was abundant and fresh at Stupinigi, July 19th. By the middle of July the females of the butterfly *Enodia dryas*, a species addicted to damp woods, moors, and heaths, as well as dry hilly districts in many parts of Central and Southern Europe, were out in Stupinigi Wood in full abundance to accompany the males which had first appeared on June 27th. The beautiful *Limenitis sibilla* in small numbers, was soon replaced by the perhaps more beautiful *Limenitis camilla*, of similar habits of flight. These latter became abundant at Stupinigi, also at Sassi and above Madonna Del Pilone, all of which villages are only a few kilometers from Turin, and are easily accessible by tram.

The males and females of *Dryas paphia* were common at Stupinigi, but much more common were both sexes of *Syntomis phegea*, which swarmed in Stupinigi Wood and was at its best in the middle of July. *Argynnis aglaia* occurred regularly in the clearings of the wood, and the Blues, especially *Polyommatus thetis* (*bellargus*) and *Cupido sebrus* seemed to have endless families and vied with the Five-spot and the Six-spot Burnet Moths (*Zygaena lonicerae* and *Zygaena filipendulae*) for the possession of the flowers. Space will not allow me to mention

more of the commoner butterflies, moths and other insects abundant in July and August in the environs of Turin.

During the latter part of August the specimens of *Rumicia phlaeas* were numerous along the wooded banks of the River Stura towards its confluence with the River Po, east of Turin. The tendency of this particular brood was distinctly towards the aberration *suffusa*, Tutt, the copper colour of the wings being suffused with dark tinting and also in many instances specimens tended towards the aberration *eleus*, Fabr., in which the copper is entirely suffused and the hindwings are distinctly tailed.

In the same locality towards the end of August both sexes of *Everes argiades* were out in abundance, in fact literally swarming, amongst the copses of *Acacia italiana*. Above the village of Madonna Del Pilone, a few specimens of the second brood of *Hamearis lucina* were on the wing in good order from August 11th to 18th. The males and females of *Pontia daphidice*, *Colias hyale*, and *Colias edusa* were becoming common, and were in excellent condition both in the dry valley of the River Scrivia at Arquata Scrivia and on the banks of the River Stura at Turin, from August 26th onwards.

In the Val San Martino across the River Po, leading gradually uphill, among the Colli Torinesi, away from Turin, I took a male and female of *Leptosia sinapis*, both in freshly emerged condition in the last week of August.

Brenthis dia, which swarms around Turin, was still quite fresh on the banks of the River Stura on August 28th.

Enodia dryas was in fresh condition much later at the River Stura than at Stupinigi Wood, the fine large females being quite perfect still on the wooded banks of the River Stura on August 26th.

I found the elegant butterfly *Hipparchia statilinus* again in quantity and in excellent condition in the wooded bottoms of the "Bluff" at Arquata Scrivia on August 26th this year. A fine form of the butterfly *Epinephele tithonus* was abundant at Stupinigi during August, the first male that I saw being on July 18th.

The Diptera taken were:—*Volucella zonaria*, Sassi, July 26th. *Eristalis tenax*, Sassi, July 27th. *Helophilus pendulus*, L., River Stura, Turin, August 28th. *Sphoerophoria dispar*, W.V., River Stura, Turin, October 6th. *Milesia crabroniformis*, Stupinigi Wood, June 6th. *Tabanus ater*, Fabr., Moncalieri, August 8th. *Sarcophaga carnaria*, L., Madonna del Pilone, between Turin and Sassi, August 10th.

The Odonata taken were:—*Sympetrum fonscolombii*, Selys., Stupinigi, September 29th. *Sympetrum sanguinea*, Müll., Stupinigi, October 12th. *Sympetrum scotica*, Don., Sassi, July 27th. *Aeschna cyanea*, Müll., Val San Martino (between Madonna del Pilone and Turin), August 30th. *Onychogomphus forcipatus*, L., Stupinigi, July 18th.

With the advent of September the heat of the sun at Turin became bearable, though during the first fortnight of the month the sun at mid-day was very powerful. From the middle of August, right through September and well into October the pretty little Dragon-fly, *Libellula pedemontana*, flies in great abundance along the small streams that fall into the River Stura near its confluence with the River Po, and I also found it in much smaller numbers along the River Sangone outside Stupinigi Wood towards the end of September. This Dragon-fly, whose length is only 28-30 mm., is easily distinguishable on the wing

by an ample dark brown transverse fascia towards the extremity of its wings. The insect is reddish in both sexes, and its mouth is yellowish. The wings are limpid, somewhat tinted with yellow at the base, the fascia across the wings is rather arched in shape, the stigma is yellowish or reddish, the nervature of the wings is reddish and the legs are black externally and partly yellowish internally. This pretty Dragon-fly which inhabits Northern Italy, is generally addicted to places rather elevated, though sometimes as round Turin, it is found in the plains. As a rule the insects are found grouped together in considerable numbers where they occur. Their flight is weak and they frequently settle on the bushes or reeds along the banks of streams, and are therefore extremely easy to catch.

Towards the end of September I found the Dragon-fly, *Libellula erythraea*, in fair numbers at Stupinigi, where it flies along the River Sangone settling continually on this or that plant, or on the stones of the dry river bed. This insect, common in Northern Italy, is 42-44 mm. in length, its head is large, the body of the male is a vivid red and that of the female is yellow-olive. The wings are limpid, with the base tinted with yellowish-red chiefly at the base of the hindwings, the stigma is yellow, and the principal nervatures are red. The top of the head is bright red in front and the legs are partly yellowish or reddish.

At the same period of the year the wasps *Vespa crabro* and *Polistes gallica* were swarming in great numbers at the sap on tree-trunks on the main road that runs through the centre of Stupinigi Wood. On September 20th I chanced across the second brood of the beautiful Copper butterfly, *Chrysophanus dispar* var. *rutilus*. I had seen and taken one perfect male of this species on May 9th, near the banks of the River Stura, but here outside Stupinigi Wood to the right approaching from Turin, where the bed of the River Sangone opens out considerably, among Dock, Bur-dock, and many other aquatic plants, on the left "bank" of running water and in a circumscribed area, I found both sexes in fair numbers, though the males were beginning to be ragged in some cases and probably September 8th would have been a better date to have found the species at its best. By September 30th they were all apparently over and the River Sangone was in full flood, though until that date it had been fordable the whole summer.

During the latter part of September the imagines of the moth *Macroglossa stellatarum* were frequent at the blossoms of *Saponaria officinale* on the opposite side of the River Sangone to the *dispar-rutilus* ground, and in the late afternoon of September 25th one fine specimen of *Deilephila livornica* flying with them, fell to my net. The males and females of the Copper butterfly, *Chrysophanus dorilis*, were in good numbers and fresh condition at Stupinigi at the same period.

Pyrameis cardui apparently does not occur, or in very small numbers, round Turin. I have not seen one throughout the fine season. About the middle of September I found the first male specimen of the Orthopteron *Acrida nasuta* on the banks of the River Stura, and from that period it has been in good numbers in both sexes there. The Orthoptera *Oedipoda caerulea* and *Spingonotus caeruleus* have swarmed in both sexes at the River Stura and at Stupinigi all

September. At the Stura on August 28th I netted a fine female of *Papilio podalirius*, and on September 13th I noticed several fresh males of small size of what I took to be a third brood of *Papilio machaon*, flying in the same locality.

I now conclude my Notes on Collecting in Northern Italy in 1918 and 1919, the two most interesting years of my life from many points of view, but before doing so I wish to record the great kindness I have received from many members of the Entomological Section of the South Kensington Natural History Museum, as also of the Entomological Society of London for their invariable kindness in assisting me to name species of insects which I caught in N. Italy. Where one and all have been so uniformly kind it would be invidious to mention names, but I thank them all most gratefully.—LIEUT. E. B. ASHEY, F.E.S., Hounslow, June 21st, 1920.

APORIA CRATAEGI. DOES IT SOMETIMES MIGRATE TO US?—Some years ago a friend of mine, who is an entomologist, reported having seen three or four *A. crataegi* feeding on flowers of the field scabious in Cornwall near Mullion. I sent the note to one of the journals but it was not published. Last week I was dining with a friend who is thoroughly up in butterflies. Both he and his wife told me they had watched three black veined whites on the coast at Lewis for quite a long time last summer. There was no mistake about it, neither was there any mistake about the first report. Is this insect in the habit of coming over from France in certain years?—(Capt.) E. B. PUREFOX, F.E.S., 87, Oakley Street, Chelsea, S.W.

SOCIETIES.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.

October 18th, 1920.—This being the opening meeting of the session was devoted to an exhibition of the work of the past season.

Mr. S. P. Doudney shewed:—*Papilio machaon*, *Nonagria typhae* (*arundinis*), *Arsiloches albopenosa*, *Senta maritima*, *Acontia luctuosa* and *Bankia argentula* from Wicken. *Semiothisa* (*Macaria*) *notata*, *Eupithecia plumbeolata*, *Lobophora halterata* and *Eulype* (*Melanippe*) *hastata* from Burnt Wood. *Argynnis cydippe* from Arnside, and from Holker, *Plebius aegon*, *Coenonympha tiphon* and *Carsia paludata*.

Mr. W. A. Tyerman brought Lepidoptera from Tan-y-Bwlch, N. Wales, including:—*Brenthis selene*, *Adscita* (*Ino*) *statices*, *Perizoma* (*Emmelesia*) *adaequata* and *Ptychopoda* (*Acidalia*) *subsericeata*, and from Llangollen, a fine dark series of *Tephrosia biundularia* var. *delamerensis*.

Mr. R. Tait had spent his holiday at Wicken and exhibited from that locality nice series of the following:—*Leucania pudorina* and *L. straminea*, *Agrotis obscura*, *Calymnia affinis*, *Bombycia* (*Epunda*) *riminalis*, *Aplecta advena*, *Lithosia griseola*, *Ania* (*Acidalia*) *emarginata*, also specimens of *Polyplocia cymatophora octogesima* and *Arsiloches albopenosa*.

The Rev. F. M. B. Carr had a specimen of *Hesperia malvae* from Delamere, this being a new record for Lancashire and Cheshire, also a specimen of *Argynnis cydippe*, a species which had not been recorded for Cheshire for many years although common in N. Lanes. Other interesting species in Mr. Carr's exhibit were:—*Mellinia* (*Xanthia*) *gilvago*, Chester; some very dark *Epirrita* (*Oporabia*) *dilatata*,

Alvanley, and fine varied series of *Noctua glareosa* and *Himera pennaria* from Delamere Forest.

Mr. S. Gordon Smith shewed long and varied series of the following:—*Dryas paphia* from the New Forest, including var. *valesina* and aberrations of the male with wedge-shaped marks instead of the usual black spots: *Melanargia galathea* from Market Risborough; several nice aberrations of *Aglais urticae*, bred from Prestatyn larvæ; from Delamere, two fine aberrations of *Polyphoca* (*Cymatophora*) *flavicornis*, a fine varied series of *Apocheima* (*Nyssia*) *hispidaria*, including quite black forms, and a series of *Noctua neglecta* and var. *castanea*. By using electric light at Chester Mr. Smith had added *Thamnomoma* (*Halio*) *brunneata* (2) to the L. and C. list, by the same method he had also taken a fine black variety of *Acronicta alni*, he also shewed a fine aberration of *Cosmotriche potatoaria*, a female having normal male colouring.

Mr. W. Mansbridge exhibited two examples of *Coenonympha pamphilus* from Crosby sand-hills which were without the usual black spot on the forewings, also four specimens of *Sarothripus revayana* from N. Lanes.

Mr. H. B. Prince had a box of *Agriades thetis* (*bellargus*) from Kent, which included some good underside aberrations.

REVIEWS AND NOTICES OF BOOKS.

The Proceedings of the South London Entomological and Natural History Society, 1919-20, 104+xvi. pp., 2 plates and text figure.

The Council is to be congratulated once more upon the volume, which it has produced in the face of the many difficulties which still meet all ventures in printing and illustrating scientific publications. The paper (a great trouble in these days) and the whole "get-up" are excellent. The book, we notice, is somewhat smaller than the last by some twenty pages, brought about, doubtless, by the stringency of conditions, certainly not by lack of matter, for some of the matters dealt with would have allowed of an amount of expansion. But the shortage of pages is quite compensated by the contents, which prove to be quite up to the standard set by this Society.

The first point which the reader notices is the record of the wonderful "esprit de corps" exhibited by the members in providing for the publication of the volume, and also for the restoration of the Society's funds to a sound, or more than sound, basis. Many another body would, we think, welcome with open arms a committee, official or unofficial, which could convert a balance of 10s. 11d. into one of £77. Nothing more need be said after this to prove the vitality of the Society.

In spite of losses, the membership has risen slightly from 157 to 162. Some of these losses strike one as having been quite tragic in their suddenness.

The gifts of the Microlepidoptera belonging to the late Rev. C. R. Digby, and the Natural History books of the late Mr. W. J. Ashdown, as well as the other specimens, are recorded.

The Hon. Librarian is able to report the doubling of the number of books borrowed during the year; evidence this that there is growing interest, and more leisure for study.

The Annual Address of the President, Mr. Stanley Edwards, touches upon many subjects, some of great interest and importance. Glancing through, we notice the statements, culled from the *Journal Economic Entomology*, that the annual damage in the United States to animal and vegetable products by insect pests is reckoned at 1,400 million dollars, or 10 per cent. of the total value of the crops, that the spread of the "Gipsy Moth" in the same country, which has been a matter of conjecture, has been traced to the presence on the young larvæ of certain inflated balloon hairs, enabling the little insects to travel long distances with the wind, and also that the supply of Tachinid flies has been found very successful in combatting this destructive enemy. The Address concludes with instances of the medical and (locally) gastronomic uses of insects. The first paper, printed "in extenso," is a short one by Mr. E. J. Bunnett, who set himself to find out how some small larvæ manage to walk upside down upon the underside of a glass plate, and gives a photograph of a part of the quickly constructed road by which they travel in that position. Mr. Bunnett has another paper (with a plate) on the pupation of some *Vanessids*. The old, old question, as to how the pupa gets rid of the larval skin without falling here meets with an answer, and the athlete "jump," which we seem to have read of somewhere, is, one hopes, finally killed.

Mr. R. Adkin's paper upon *Scopula (Acidalia) marginepunctata* brings together pretty well all that is known in Britain of the history and nomenclature of this erratic insect; erratic, that is in the experience of the writer, who, having once or twice in his lifetime taken it in abundance, has observed its absence during long intervening periods.

Mr. B. W. Adkin, dealing with "some insects injurious to Forestry," invited a remark upon the instance of gross and ignorant carelessness on the part of the authorities responsible for the felling of timber for war purposes, in leaving the debris rotting on the ground, to harbour the enemies of trees, and keep the races in form to destroy, or at least to injure, the new growth.

We are bound in common fairness to recall the cry of objection when these waste branches were burned, as destructive and inexcusable when the country was suffering from shortage of fuel. The real trouble probably being that transport was not available.

Then there is a paper on "British Fern Varieties," by Mr. F. W. Thorington, which opens ones mind to the limitations of insular situations. There are, it would appear, but 43 recognised species of Fern, indigenous to Britain, yet the recorded varieties of these 43 quite outnumber those of any other part of the globe.

Mr. Frohawk has a paper upon the "Migration of Birds," in which he observes the probable causes, the sense of direction, and the enormous speed at which our winged neighbours are able to travel.

The papers conclude with one by Dr. Boulenger upon "British Batrachians," which would appear to be very inclusive, and of great interest to those who study these animals.

In the Abstract of Proceedings, there is a very exhaustive account of the variation of *Aglais urticae*. Though we had our suspicions, we had no realisation of the number of named forms of this species. Doubtless Mr. Turner's painstaking note will be of great interest and service to those who specialise in this insect.

The Meetings of the Society have evidently been well supported, and the exhibits well maintained in number and quality. The Exhibition of Other Orders was repeated during the year under review, and appreciated. Four Field Meetings were held, two of which would appear to have been favoured by decent weather.

The Annual Exhibition of Varieties is always an event with the "South London," and appears to have been as successful as ever. The list of exhibits would appear to be as lengthy as in other years.—C.R.N.B. November 30th, 1920.

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Mr. Donisthorpe will still be glad to receive ants and Myrmecophiles from all parts of the British Isles, and to name any such for anyone who is kind enough to send them to him. He would however suggest that ants from any other parts of the world be sent to his colleague, Mr. W. C. Crawley, 29, Holland Park Road, W. 14. Mr. Crawley is specialising on the ants of the world, and it is a matter for congratulation that we should possess an Entomologist in this country whose whole attention should be concentrated on this branch of Entomology.

MEETINGS OF SOCIETIES.

Entomological Society of London.—11, Chandos Street, Cavendish Square, W., 8 p.m.: 1921, January 19th; Annual Meeting.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E. 3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street, E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. (No Meetings in July or August.) Visitors welcomed.—Hon. Sec., W. E. GLEGE, 44, Belfast Road, N. 16.

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Differentiation of *Melitæa athalia*, *parthenie*, and *aurelia*—The Doubleday collection—
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SPECIAL INDEX.

By HY. J. TURNER, F.E.S.

Coleoptera arranged in order of Genera. The other orders arranged by Species. Genera, Species, etc., new to Britain are marked with an asterisk, those new to Science with two asterisks.

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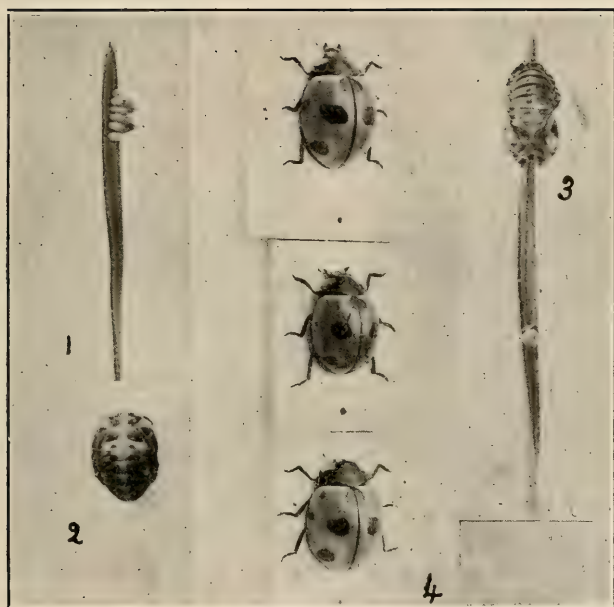
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CORRIGENDA, Etc.

Corrections in spelling of scientific names are made in the Special Index.

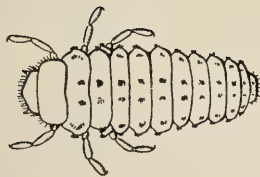
- Page 45. line 4 from bottom, for "habits" read "habitats."
 ,, 67. last line transferred above footnote.
 ,, 118. line 21, "when" should read "where."
 ,, 128. line 4 from bottom, for "north-western" read "south-western."
 ,, 144. Dr. Chapman points out that the footnote is in error, and refers me to a result subsequent to that I had relied on.
 ,, 157. for "frontale" and "parietale" read "frontal" and "parietal."
 ,, 207. line 6 from the bottom, for "100" read "194."
 Pl. V., figs. 2 and 2a, "*mariae*, sp. nov.," should read "*pallidum*, Donisthorpe.
 Vol. xxxi., p. 170, 172, etc., delete "*Strymon pruni*" in Lieut. E. B. Ashby's notes.



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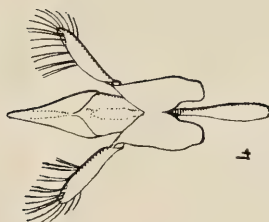
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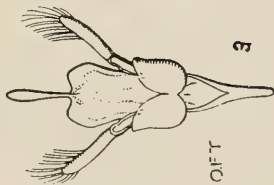
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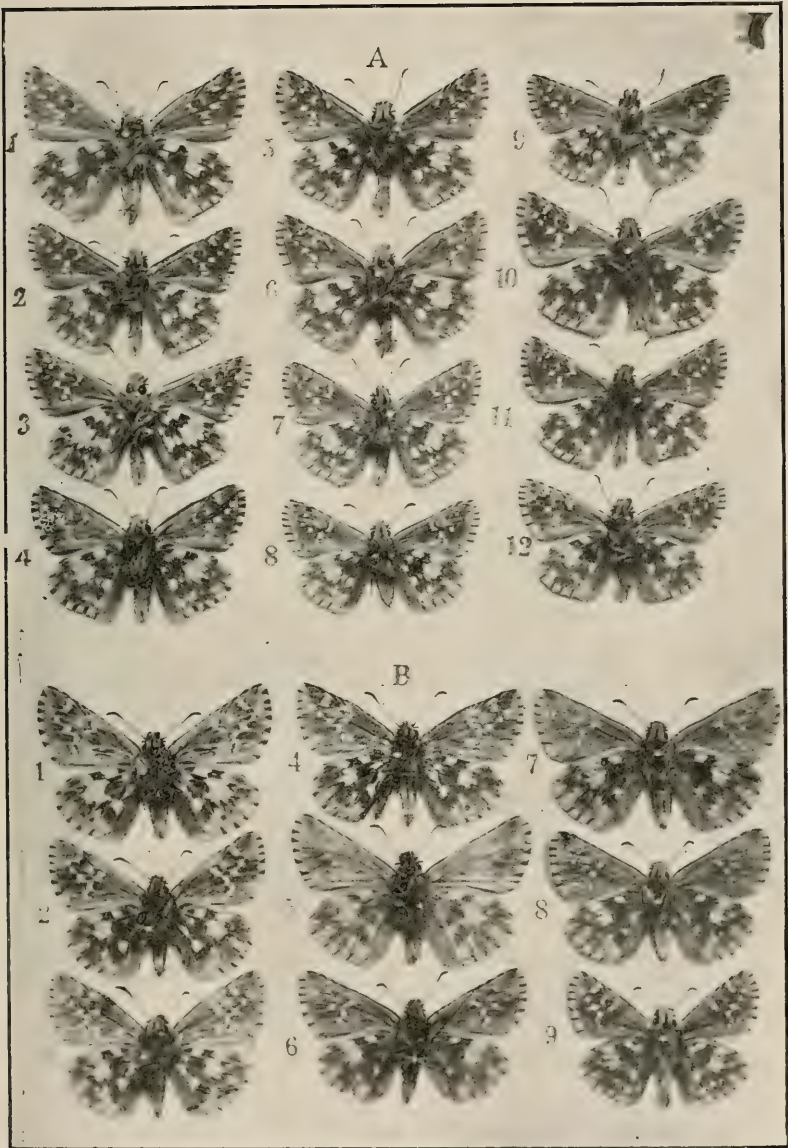
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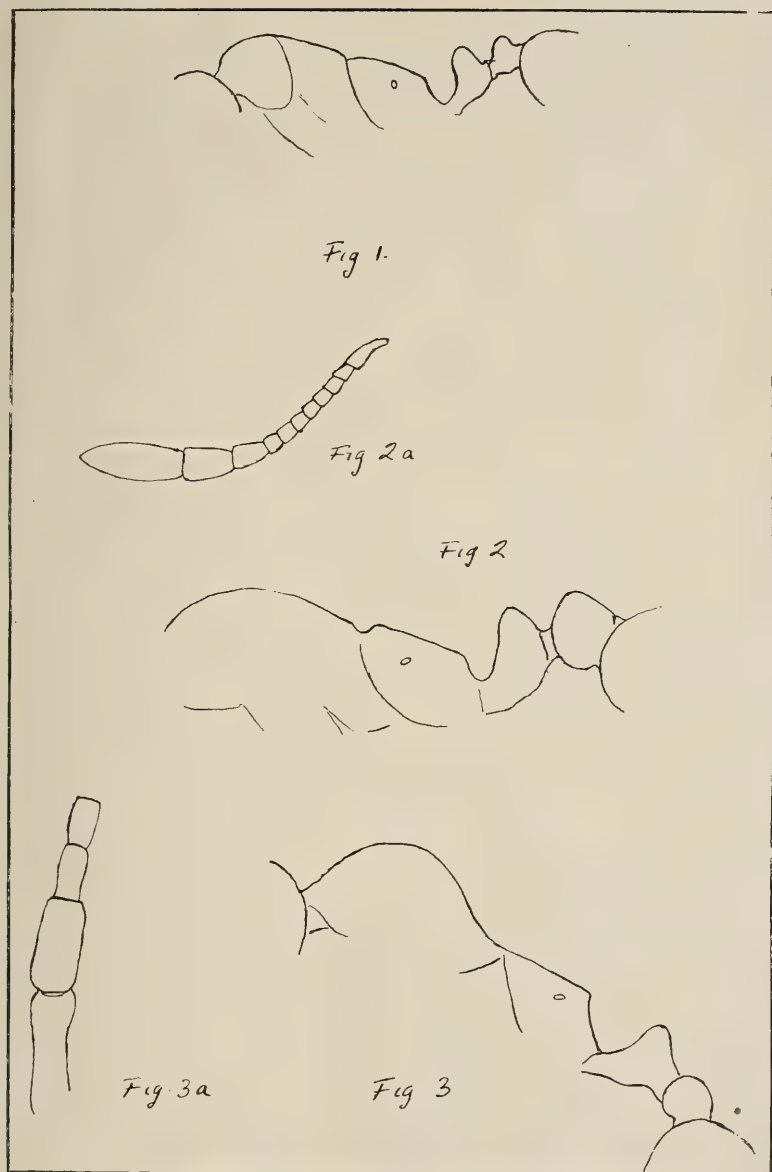
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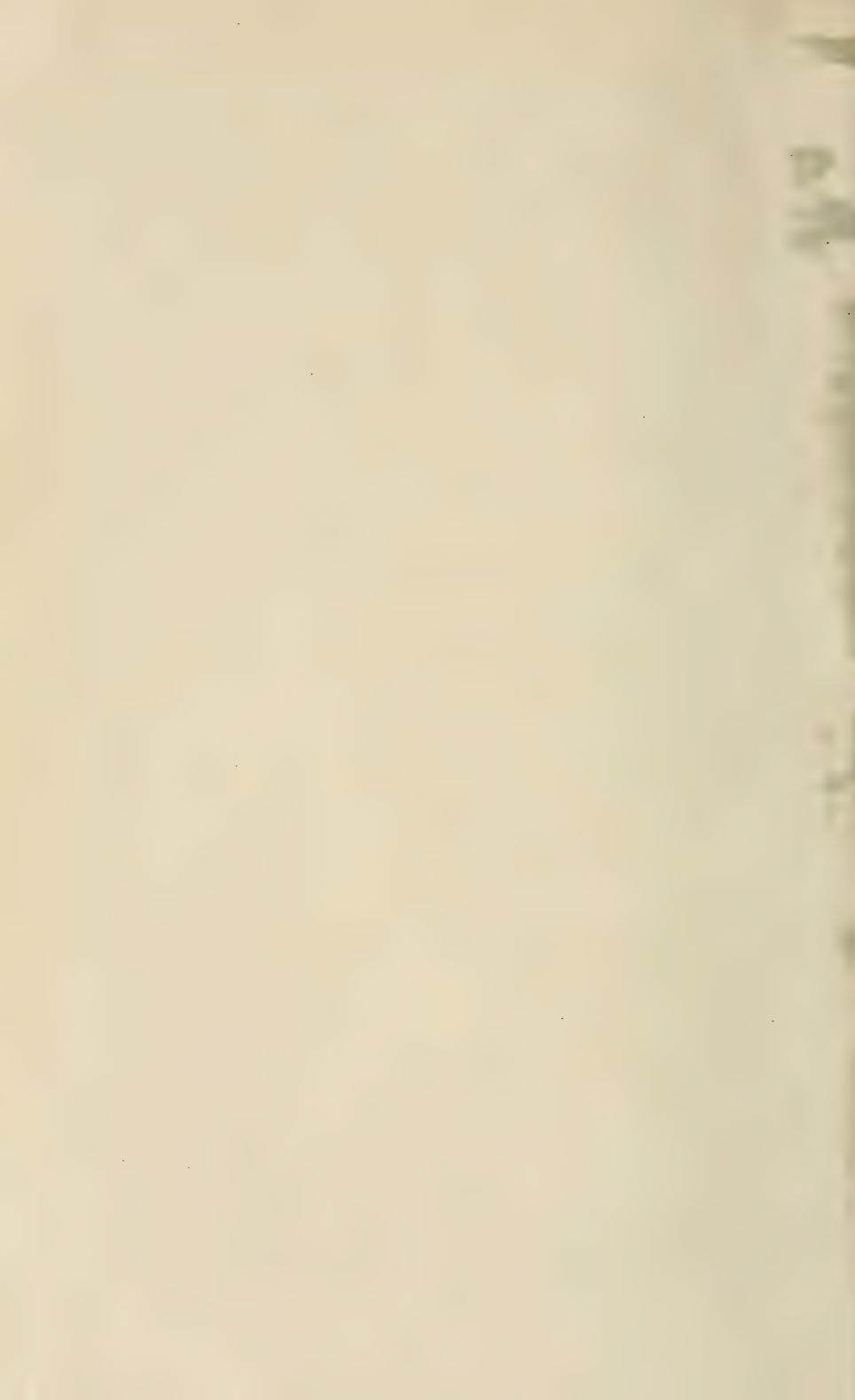
W. C. Crawley del.

Fig. 1. Thorax and Pedicel of *Monomorium buxtoni*, sp. nov.Fig. 2. " " " *Monomorium mariae*, sp. nov.

Fig. 2a. Funiculus of same.

Fig. 3. Thorax and Pedicel of *Messor platyceras*.

Fig. 3a. End of Scape and first 3 joints of Funiculus of same.



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